U.S. Mines, Bur. of

Technical Paper 129

DEPARTMENT OF THE INTERIOR
FRANKLIN K. LANE, SECRETARY
BUREAU OF MINES
VAN. H. MANNING, DIRECTOR.

METAL-MINE ACCIDENTS

IN THE

UNITED STATES

DURING THE CALENDAR YEAR 1914

TN
23
U63
no 129
ENGINEERING
EGIN STORAGE

COMPILED BY

ALBERT H. FAY

LIBRARY
JUN 25 1917
UNIVERSITY OF TORONTO.

WASHINGTON
GOVERNMENT PRINTING OFFICE
1916

Digitized by the Internet Archive
in 2011 with funding from
University of Toronto

http://www.archive.org/details/technicalpaper129unit

Technical Paper 129

DEPARTMENT OF THE INTERIOR
FRANKLIN K. LANE, SECRETARY
BUREAU OF MINES
VAN. H. MANNING, DIRECTOR.

METAL-MINE ACCIDENTS

IN THE

UNITED STATES

DURING THE CALENDAR YEAR 1914

COMPILED BY

ALBERT H. FAY

WASHINGTON
GOVERNMENT PRINTING OFFICE
1916

The Bureau of Mines, in carrying out one of the provisions of its organic act—to disseminate information concerning investigations made—prints a limited free edition of each of its publications.

When this edition is exhausted copies may be obtained at cost price only through the Superintendent of Documents, Government Printing Office, Washington, D. C.

The Superintendent of Documents *is not an official of the Bureau of Mines.* His is an entirely separate office and he should be addressed:

SUPERINTENDENT OF DOCUMENTS,
Government Printing Office,
Washington, D. C.

The general law under which publications are distributed prohibits the giving of more than one copy of a publication to one person. The price of this publication is 15 cents.

First edition. January, 1916.

CONTENTS.

	Page.
Introduction	3
Decrease of fatality rate in 1913	3
Scope of statistics	5
Acknowledgments	6
Publication of accident statistics	6
Copper mines	7
Gold and miscellaneous metal mines	7
Iron mines	8
Lead and zinc mines	8
Miscellaneous mineral mines	9
Accident statistics by States	9
Causes and distribution of accidents	10
Serious and slight injuries	10
Revised classification of injuries for 1915 and 1916	12
Tabulated statistics	12
Determination of number of men employed	54
Basis for computing fatality rates	54
Fatality rates on a tonnage basis	55
Importance of considering time element	55
Metal-mine fatality rates compared on basis of 300 working days	58
Accidents classified by mining methods	59
Overhand stoping (narrow veins)	61
Overhand stoping (wide veins)	62
Room and pillar	63
Caving systems	64
Open-pit mining, with steam shovel	65
Open-pit mining, without steam shovel	66
Fatalities at placer mines	74
Metal-mine, coal-mine, and quarry accidents compared	77
Metal-mine accidents in foreign countries	79
Nonfatal accidents classified by parts of body injured	79
Accidents at metallurgical works	82
Who is to blame for mine accidents	85
Form for mine-accident records, 1916	88
Laws relating to reporting of accidents	89
Alaska	89
Arizona	89
California	90
Colorado	90
Idaho	91
Illinois	91
Maryland	91
Michigan	92
Minnesota	92
Missouri	92

Laws relating to reporting of accidents—Continued. Page.
Montana ... 92
Nevada ... 93
New Jersey ... 93
New York ... 93
Oregon ... 94
Pennsylvania ... 94
South Dakota ... 95
Washington ... 95
Wisconsin ... 95
Publications on mine accidents and methods of mining ... 96

ILLUSTRATIONS.

Page.
PLATE 1. Form for recording accidents at mines and metallurgical plants ... 88
FIGURE 1. Fatality rates compared by causes of accidents and by mining methods ... 60
2. Injury rates compared by causes of accidents and by mining methods ... 61
3. Nonfatal injuries classified according to part of body affected ... 82

TABLES.

Page.
TABLE 1. Number of **men employed** and number of men **killed** and **injured** in and about **all metal** and miscellaneous mineral mines (except coal mines) in the United States during the calendar years 1914 and 1913 ... 13
2. Number of **men killed** and **injured** in and about **all metal** and miscellaneous mineral mines (except coal mines) in the United States during the calendar year 1914, **by causes** ... 14
3. Number of **men killed** in and about **all metal** and miscellaneous mineral mines (except coal mines) in the different **States** during the calendar year 1914, by causes ... 18
4. Number of **men killed** in and about the various groups of mines in the United States during the calendar year 1914, by causes ... 22
5. Number of **men employed**, number of **days worked**, and number of **men killed** per 1,000 employed in and about **all metal** and miscellaneous mineral mines (except coal mines) in the different States during the calendar year 1914 ... 30
6. Number of **men employed**, number of **days worked**, and number of **men killed** per 1,000 employed in and about the **copper mines** in the United States during the calendar year 1914 ... 31

Page.

TABLE 7. Number of **men employed,** number of **days worked,** and number of **men killed** per 1,000 employed in and about the **gold** and miscellaneous metal mines in the United States during the calendar year 1914 32

8. Number of **men employed,** number of **days worked,** and number of **men killed** per 1,000 employed in and about the **iron mines** in the United States during the calendar year 1914 33

9. Number of **men employed,** number of **days worked,** and number of **men killed** per 1,000 employed in and about the **lead and zinc mines** (Mississippi Valley) in the United States during the calendar year 1914 34

10. Number of **men employed,** number of **days worked,** and number of **men killed** per 1,000 employed in and about the **miscellaneous** mineral mines in the United States during the calendar year 1914. 35

11. Number of men **seriously** injured in and about **all metal** and miscellaneous mineral mines (except coal mines) in the United States (by States) during the calendar year 1914, by causes 36

12. Number of men **slightly** injured in and about **all metal** and miscelneous mineral mines (except coal mines) in the United States (by States) during the calendar year 1914, by causes 40

13. Number of men **seriously** and **slightly** injured per 1,000 employed in and about **all metal** and miscellaneous mineral mines (except coal mines) in the United States (by States) during the calendar year 1914 44

14. Number of **mine operators** reporting less than 1,000 days' work performed and number of those reporting 1,000 or more days' work performed during the calendar year 1914 46

15. **Percentages** of **deaths** in and about **all metal** and miscellaneous mineral mines (except coal mines) in the United States resulting from various causes during the calendar years 1914, 1913, 1912, and 1911 47

16. **Percentages** of **injuries** in and about **all metal** and miscellaneous mineral mines (except coal mines) in the United States resulting from various causes during the calendar years 1914, 1913, 1912, and 1911 48

17. Number of **men killed** or **injured** per 1,000 employed in and about **all metal** and miscellaneous mineral mines (except coal mines) in the United States, based on the actual average number of days worked, compared with similar data based on a year of **300 working days** 50

18. Comparison, by years, of the number of **men employed** in the **metal** mines of the **principal countries,** showing the fatality rate per 1,000 persons employed 51

19. Number of **men employed,** number of days worked, and number of men killed per 1,000 employed in and about **all metal** and miscellaneous mineral mines (except coal mines) in the different States during the calendar year **1913. (Revised)** 52

20. Number of **men employed,** number of days worked, and number of men killed per 1,000 employed in and about the **gold** and miscellaneous metal mines in the United States during the calendar year **1913. (Revised)** 53

Page.

TABLE 21. **Coal-mine** fatality rates based on the number of 2,000-hour workers as compared with the rate based on the number of men reported as employed. (1903–1913, inclusive, except 1909) 56

22. Summary of **metal-mine** accident data grouped by **methods of mining**. (1914) 68

23. **Fatalities** and **injuries** classified by principal causes and **mining methods**. (1914) 70

24. **Metal-mine** accidents by causes, grouped by **mining methods**. (1914) 74

25. Accidents in **placer mines** in the United States during the calendar years 1912, 1913, and 1914 75

26. Number of men employed, number killed, and days worked in **placer mines** in the United States during the calendar year 1914. 76

27. **Nonfatal** injuries, by causes, showing **parts of body** injured, in and about certain metal mines in the United States (partial list only). 80

28. Summary of accidents at **ore-dressing** plants in the United States, 1913 and 1914 83

29. Summary of accidents at **smelting plants** in the United States, 1913 and 1914 84

30. Number of men employed and average number of days worked at **metallurgical plants** (excluding iron blast furnaces) in the United States during the calendar years 1913 and 1914 85

31. **Responsibility** for fatal accidents in the Union of South Africa 87

METAL-MINE ACCIDENTS DURING THE CALENDAR YEAR 1914.

Compiled by ALBERT H. FAY.

INTRODUCTION.

The death rate in the metal mines of the United States in 1914 shows a slight decrease from the record of any previous year, the total number killed, as reported to the Bureau of Mines by the operators, being 559, as compared with 683 in 1913, 661 in 1912, and 695 in 1911. The number of men employed during 1914 was 158,115, as compared with 191,276 in 1913, 169,199 in 1912, and 165,979 in 1911. The fatality rate was therefore 3.54 per 1,000 men employed, as against 3.57 per 1,000 for 1913, 3.91 for 1912, and 4.19 for 1911.

Fatality figures for the calendar years 1911, 1912, 1913, and 1914 for all mines and quarries in the United States follow:

Number of men employed and number killed in and about all mines and quarries in the United States, 1911 to 1914.

Kind of mines.	Number employed.	Number killed.	
		Total.	Per 1,000 employed.
Metal mines	158,115	559	3.54
Coal mines	763,185	2,454	3.22
Quarries	87,936	180	2.05
Total for 1914	**1,009,236**	**3,193**	**3.16**
Total for 1913	1,045,198	3,651	3.49
Total for 1912	1,004,966	3,234	3.22
Total for 1911	1,005,281	3,602	3.58

DECREASE IN FATALITY RATE IN 1914.

The total number of persons killed in the metal mines during 1914 was less than in 1913, but there were about 33,000 less men employed. The fatality rate, however, shows only a slight decrease, from 3.57 in 1913 to 3.54 per 1,000 employed during 1914. A number of the States show a slight increase, but most of the principal mining States show marked decreases. The States that show a reduction of 50 per cent or more include Kansas, Oregon, and Virginia. Of those showing more than 20 per cent decrease, and less than 50 per cent, Alaska, Minnesota, New Jersey, and South Dakota may be mentioned. Arizona shows a decrease of 14 per cent, and Missouri and New York each 13 per cent. Nevada and Montana are the only States showing

a continuous reduction in fatality rates during the four years that the bureau has been collecting accident statistics.

These reductions are to be accounted for largely by the introduction of safety appliances, better supervision, a stricter enforcement of rules and regulations, and a closer observance of State laws. Practically all of the larger companies, and many of the smaller ones, have done much in safeguarding their employees, and have helped to spread the "safety-first" movement. By first-aid treatment many slight injuries have been properly dressed, so that pain has been relieved and a cure effected in a short time, with the added result that many minor injuries have been kept from becoming serious or fatal.

The number of fatalities and the number killed per 1,000 employed in the metal mines of the United States during each of the years 1911 to 1914 are shown in the following table:

Number of men killed and number killed per 1,000 employed in and about the metal mines in the United States during the calendar years 1911, 1912, 1913, and 1914.

State.	Number killed.							
	1911		1912		1913		1914	
	Total.	Per 1,000 employed.	Total.	Per 1,000 employed.	Total.	Per 1,000 employed.	Total.	Per 1,000 employed.
Alabama	10	2.44	33	6.84	22	4.22	25	4.78
Alaska	(a)	(a)	b 21	10.97	25	3.13	19	2.38
Arizona	70	5.48	67	4.30	86	5.22	63	4.50
Arkansas, Indiana, Louisiana, Rhode Island, and West Virginia	3	4.67	1	1.01	1	1.21	1	2.12
California	38	3.49	40	3.88	52	4.53	41	4.20
Colorado	43	4.13	48	5.40	44	2.76	47	5.09
Florida	9	2.09	6	1.34	14	3.09	10	3.47
Georgia	2	2.00	0	.....	1	2.25	1	3.28
Idaho	23	4.79	29	4.66	24	4.16	25	4.76
Illinois	1	1.18	1	2.27	1	1.96	0	.....
Iowa	1	4.10	0	.....	0	.....	0	.....
Kansas	2	2.74	2	2.41	4	6.58	1	3.17
Kentucky	3	6.51	1	2.17	0	.....	2	9.05
Michigan	134	4.24	96	3.26	82	2.91	99	3.63
Minnesota	76	4.59	50	3.02	63	3.22	43	2.43
Missouri	38	3.84	36	3.16	34	3.49	25	2.95
Montana	62	4.65	50	3.75	64	3.28	39	2.99
Nevada	50	8.05	34	4.51	25	3.42	22	3.23
New Hampshire	0	.....	1	11.11	0	.....	0	.....
New Jersey	23	13.23	13	7.96	8	5.58	4	2.93
New Mexico	11	4.49	13	5.20	28	7.43	5	2.06
New York	10	3.12	17	6.27	14	4.19	11	3.66
North Carolina	4	4.01	1	.94	4	3.43	8	8.05
Ohio	0	.....	1	3.23	0	.....	0	.....
Oklahoma	0	.....	2	3.70	1	1.56	3	5.03
Oregon	2	1.43	1	.95	3	2.22	1	.78
Pennsylvania	1	1.16	2	2.62	0	.....	0	.....
South Dakota	8	3.18	6	3.06	8	3.83	4	2.17
Tennessee	10	2.25	12	3.45	10	3.17	18	5.53
Texas	0	.....	0	.....	1	2.86	0	.....
Utah	49	6.36	41	4.85	36	4.59	29	4.97
Vermont	0	.....	2	11.05	1	6.99	0	.....
Virginia	6	1.51	4	1.59	12	4.62	2	1.07
Washington	3	1.91	4	3.06	4	3.07	0	.....
Wisconsin	3	1.05	22	5.74	11	2.54	11	4.27
Wyoming	0	.....	4	6.04	0	.....	0	.....
Total	**695**	**4.19**	**661**	**3.91**	**683**	**3.57**	**559**	**3.54**

[a] Not reported. [b] Placer mines not included. Snow slide killed 9 men.

SCOPE OF STATISTICS.

The following tables giving the accidents in the metal mines in the United States for the calendar year 1914 have been compiled by the Bureau of Mines from reports received directly from the operators, except in the case of Alaska and New York. In the compilation of these figures the size of the mines was not considered, and the figures cover reports from prospectors, development companies, and producing mines.

Although the Bureau of Mines is authorized to collect data relating to accidents at mines, there is no Federal law compelling operators to render such reports. However, the majority of the operators promptly and cheerfully replied to the bureau's requests for information. The tabulated statistics represent 4,805 operators who actually worked their mines during the year. As far as can be ascertained, all of the large companies made out detailed reports, so that, measured on the basis of production, the statistics represent the industry.

The tables in the following pages are arranged so as to represent five divisions of the mining industry, as follows:

Copper mines.—All of the copper mines and prospects that were reported in operation in the various copper-producing States are included in this group. The list represents 585 operators.

Gold and miscellaneous metal mines.—Under this heading are the gold mines, both lode and placer, silver mines, lead-silver mines, gold-silver mines, the lead and zinc mines other than those in the Mississippi Valley, and mines working ores of quicksilver, manganese, tungsten, vanadium, chromium, etc. Pyrite mines are included in this class, as the cinder is used in some of the metallurgical works for its iron and copper content. Bauxite mines, because bauxite is the principal source of metallic aluminum, are classed under this division. This group represents 3,536 operators, who reported their mines as active part or all of the year.

Iron mines.—All of the important iron mines, representing 196 operators, are given in the tables showing statistics relating to iron mining.

Lead and zinc mines (Mississippi Valley).—The lead and zinc mines, represented by reports of 248 operators of that region, are grouped together as representing an industry in which general conditions are similar.

Miscellaneous mineral mines.—The miscellaneous mineral mines, representing 240 operators, include those for asbestos, asphaltum, barite, feldspar, garnet, graphite, gypsum, kaolin, mica, phosphate rock, quartz, talc, salt, and soapstone. Coal mines are not included in this classification.

ACKNOWLEDGMENTS.

The acknowledgments of the bureau are due to the State mine inspectors and other officials of the various State mining departments, who have rendered invaluable assistance in verifying and correcting from their records, often at the expense of considerable time and trouble, the data reported to the bureau by the operators. Special mention should be made of the assistance rendered by the mine inspectors of Alaska, Arizona, Colorado, Idaho, Missouri, Nevada, New York, and South Dakota, and the Industrial Accident Commission of California. To both the operators and the State mining officials the Bureau of Mines extends its thanks for their hearty cooperation. The author acknowledges the assistance rendered by E. S. Boalich and W. W. Adams in the compilation of the data presented in this report.

PUBLICATION OF ACCIDENT STATISTICS.

In publishing these statistics the Federal Bureau of Mines has no intent of encroaching on the field covered by the annual or biennial reports of State mine inspectors or mining departments. The bureau hopes, however, that the distribution of the information will help to establish a uniform basis for recording and reporting mine accidents, the number of men employed, and the number of days' work performed. When all mine-accident statistics are thus placed on the same basis, the making of comparisons and the drawing of conclusions will be rendered much easier.

The plan that is proposed as most likely to assure the procuring of satisfactory statistics is that of cooperation between the Bureau of Mines and the inspectors or other appropriate representatives of the States. This cooperation will insure such uniformity in method and results as will make the data for each State comparable with the data of any other State and the data for the mining industries of the United States comparable with those of the mining industries in other countries. Also, this plan has the merits of avoiding duplication of labor and expense and of insuring satisfactory results at minimum cost to both the Federal Government and the several States.

As bearing on the difficulties that attend the compilation of comparable figures, attention is called to the fact that a number of States have no inspectors for metal mines and there is a lack of uniformity in the reports issued by the various States that have inspectors. The fiscal years of the States are not uniform, some ending in June, others in September or October, and still others conforming to the calendar year.

In those States having an inspection service the fatality figures given herein were submitted to the various inspectors for verification, and from nearly all the bureau has received hearty cooperation.

Only a few of the States collect statistics covering serious injuries, and still fewer give any attention to slight injuries, so that on these points it is impossible to check closely. Although the total number of deaths reported in the various States agrees closely with the inspectors' reports, there is some variation as to the classification.

The Bureau of Mines will be glad to receive suggestions from State inspectors, and from any person interested in mining, as to the form in which the statistics can be presented most effectively and as to the method of making their publication most useful to the mining industry.

COPPER MINES.

The figures given in Tables 2, 4, and 6 are compiled from reports of 585 operators of copper mines employing 44,686 men, of whom 31,265 were employed underground and 13,421 on the surface. Of the 585 operators, 371 were working prospects and small mines in which less than 1,000 days' labor was performed. The other 214 were operators of mines where 1,000 or more days' labor was performed.

The total number of deaths and injuries due to accidents, and the rates per 1,000 employed, as reported (Table 1) are as follows: Deaths, 165, or 3.69 per 1,000 men employed; serious injuries, 2,037, or 45.58 per 1,000; slight injuries, 11,330, or 253.55 per 1,000. Of the total number of fatalities, 147 occurred underground, making the rate per 1,000 employed 4.70. The number of surface fatalities was 18, or 1.34 per 1,000.

Although the ratios of serious and slight injuries for this group of mines appear exceedingly high, this is not so much due to greater hazards as to the fact that the copper mines are worked by well-organized companies practically all of whom have a safety department in charge of a competent safety engineer. The result is that accurate records are kept, and it is believed that the records shown by both the copper and iron mines of the United States represent more nearly the actual hazard in the mining industry than do the records for any other group. One class of injuries in the copper-mining industry that increases the accident rate is due to the character of the ore handled in the Lake Superior district. Much of the rock in this district contains metallic copper and the men receive many cuts and scratches in handling it.

GOLD AND MISCELLANEOUS METAL MINES.

The accidents in and about the gold and miscellaneous metal mines are compiled in Tables 2, 4, and 7 from the reports of 3,536 operators, employing 48,438 men, of whom 35,432 were underground and 13,006 surface men. The number of deaths and injuries due to accidents and the rates per 1,000 employed (Table 1) are as follows: Deaths, 179, or 3.70 per 1,000 men employed; serious injuries, 911,

or 18.81 per 1,000; slight injuries, 4,690, or 96.82 per 1,000. Of the total number of fatalities, 154 occurred underground, or 4.35 per 1,000, and 25 on the surface, or 1.92 per 1,000.

The rates of serious and slight injuries are low when compared with the corresponding rates at iron and copper mines. The difference may be explained largely by the fact that this group includes many prospects and small mines that keep no records, and many of the mines are in States where there is no inspection and the operators do not have to report accidents. At such mines accidents that are not serious are forgotten, but fatal accidents are remembered and reported. For their own protection the majority of the larger companies operating gold, silver, and lead-silver mines in the West have hospital service and medical aid for their employees and are keeping excellent records.

IRON MINES.

The figures given in Tables 2, 4, and 8 are compiled from the reports of 196 iron-mine operators, who employed 44,807 men, of whom 24,847 were employed underground and 19,960 on the surface, including those engaged in steam-shovel work. The number of deaths and injuries resulting from accidents in these mines (Table 1) is as follows: Deaths, 148, or 3.30 per 1,000 men employed; serious injuries, 1,851, or 41.31 per 1,000; and slight injuries, 6,922, or 154.48 per 1,000. Of the total number of fatalities, 120 occurred underground, or 4.83 per 1,000 employed, and 28 employees were killed while engaged in surface work, making this rate 1.40 per 1,000.

The injury rates at the iron mines, as at the copper mines, appear high but, as has been stated, the iron mines are operated by well-organized companies, who are conducting a safety campaign and are keeping excellent records of accidents. The accident hazard has not increased, but the records are so well kept that the real hazard of the mining industry is being brought out.

LEAD AND ZINC MINES.

The lead and zinc mines for which data are compiled include those in the Mississippi Valley only. The lead and zinc mines of other States are grouped with miscellaneous metal mines on account of the difficulty of making a distinct classification, as in many places, for instance, in the lead-silver mines in the Coeur d'Alene district of Idaho, lead and zinc occur as associated metals in silver ores. The Mississippi Valley lead and zinc mines form a class by themselves and are easily segregated.

The figures given in Tables 2, 4, and 9 are compiled from the reports of 248 operators, employing 10,935 men, of whom 7,609 were employed underground and 3,326 on the surface. Of the 248 operators

reporting, 67 operated small mines and prospects at each of which less than 1,000 days' labor was performed.

The total number of deaths and injuries due to accidents as reported (Table 1) is as follows: Deaths, 40, or 3.66 per 1,000 men employed; serious injuries, 146, or 13.35 per 1,000; and slight injuries, 1,605, or 146.78 per 1,000. Of the total number of fatalities, 37 occurred underground, making the rate 4.86 per 1,000 men employed below the surface. The surface fatalities were 3, or 0.90 per 1,000 employed.

The fatality rate for underground employees in the lead and zinc district is slightly higher than for any other group. The serious injuries do not appear so high, but this again may be accounted for largely by the fact that many of the mines are operated by small companies, and it is doubtful whether complete records are being kept. The slight injuries, however, follow closely after those at iron mines although they are not quite so high.

MISCELLANEOUS MINERAL MINES.

The reports of 240 operators of miscellaneous mineral mines are compiled in Tables 2, 4, and 10. These mines employed 9,249 men, of whom 2,465 were employed underground and 6,784 on the surface. The total number of deaths and injuries due to accidents reported (Table 1) is as follows: Deaths, 27, or 2.92 per 1,000 employed; serious injuries, 128, or 13.84 per 1,000; and slight injuries, 596, or 64.44 per 1,000. When compared with the rates for the copper and iron mines, these ratios seem exceedingly low. The reports received indicate that this difference is largely explainable by the mines being small and not keeping complete records. Most of the mines are in States where there are neither State inspection nor compensation laws, and operators are not obliged to keep accident records or to report accidents. Furthermore, about 75 per cent of the men are employed on the surface, the hazards being thus reduced to those of quarry operations. The figures for 1914 show a higher injury ratio than for previous years, indicating that the educational campaign is resulting in more complete records being kept.

ACCIDENT STATISTICS BY STATES.

A compilation of the accident statistics, by States, is given in Tables 3, 5, 11, 12, and 13, representing 4,805 operators employing 158,115 men, of whom 101,618 were employed underground and 56,497 on the surface. The total number of fatalities and serious and slight injuries due to accidents is as follows: Deaths, 559, or 3.54 per 1,000 men employed; serious injuries, 5,073, or 32.08 per 1,000; and slight injuries, 25,143, or 159.02 per 1,000. Of the total

number of fatalities, 466 occurred underground, or at the rate of 4.59 per 1,000, and 93 were killed on the surface, or 1.65 per 1,000 employed.

The great irregularity of the ratio between serious and slight injuries in different States is evident. The reason for this difference is discussed under the heading, "Serious and slight injuries," where extracts from State laws are given.

CAUSES AND DISTRIBUTION OF ACCIDENTS.

In Tables 15 and 16 is given the percentage of deaths and injuries due to any one cause in each group of mines and for all of the mines combined. It will be noted, for instance, that 50 per cent of the deaths in lead and zinc mines, 34.93 per cent of the serious injuries, and 15.70 per cent of the slight injuries were due to falls of rock or ore from roof or wall. A similar comparison may be made for any group of mines for any one of the 41 causes enumerated. This table also shows that approximately two-thirds of the total deaths and injuries that occurred in and about metal mines were caused as follows:

Of the fatalities, 37.56 per cent was due to falls of ore or rock from roof, wall, or bank; 16.11 per cent to falling down stope, shaft, winze, or bank; 10.73 per cent to explosives; and 8.96 per cent to haulage systems.

Of the serious injuries, 32.48 per cent was due to falls of roof, wall, or bank; 16.38 per cent to car and haulage systems; 10.97 per cent to timber and hand tools; and 7.94 per cent to machinery.

Of the slight injuries, 34 per cent was due to falls of roof, wall, or bank; 12.54 per cent to car and haulage systems; 12.29 per cent to timber and hand tools; and 7.88 per cent to machinery.

Mine fires caused 10 fatalities in 1914, none in 1913, 1 in 1912, and 37 in 1911. Fatalities due to falling down shaft were 34, as compared with 26 in 1913, 40 in 1912, and 57 in 1911.

SERIOUS AND SLIGHT INJURIES.

The definition of an accident, a fundamental consideration, varies widely among mining companies and is far from the same in the laws of all States requiring reports. One operator or State may require a detailed report of any casualty, however slight, that delays the worker or that draws blood; another may not consider an accident worthy of record that does not come to the attention of the foreman or shift boss.

The list of reportable accidents has been increased so much within the last three or four years by the enactment of compensation laws, by closer inspection, and by the companies themselves that statistics

seem to show a far greater number of casualties now than in the past. However, it is essential that every company have a record of any accident that may result in a serious injury for which compensation may be claimed, and also to prevent unjust claims arising, as then any case can be traced to its origin, and the records will show full details. As many companies require a record of all injuries, it is not as easy as it formerly was to substantiate unjust claims. The use of minute and detailed classification is especially noteworthy in the Lake Superior district.

The distinction made in this paper between a serious and a slight injury is entirely arbitrary. A line had to be drawn somewhere, and hence a serious accident is considered in this report as one that would disable a man and keep him from duty 20 days or more. This class includes such injuries as broken arms and legs, loss of eye, and severe cuts and bruises.

A slight injury is considered as one that involves a loss of time of not less than 1 day nor more than 20 days. Under this class may be placed such injuries as cuts, sprains, mashed fingers, bruises, dirt in eye, slight burns, effect of powder smoke, etc. Of course any slight injury may be infected and thus become a serious accident as defined above.

In some States there is no law whatever requiring a record of injuries or a report to any industrial or insurance board, commissioner of labor, or inspector, whereas in other States strict laws govern this feature. In those States where there are such laws the majority of the mining companies keep excellent records from which reports for the Bureau of Mines are compiled, and it is in these States that the injury ratio in many cases is very high. Unless all States report on the same basis, just comparisons can not be made.

In making comparisons of serious and slight injuries in the various States, it is necessary to take into account the laws governing the report of such injuries. (See pages 89 to 96, inclusive.) One State may report fatal and serious injuries only, but without defining a "serious injury," and require no reports for slight injuries. One State may require reports of all fatalities and injuries incapacitating the employee for 1 week; others may specify the reporting of accidents causing disabilities ranging from 1 to 14 days. Thus one State may report, perhaps, only 25 per cent as many injuries as some other States in which the mining industry is of no greater magnitude. At first glance it would appear that mining is much safer in the former State than in any of the latter, but this, however, is a wrong conclusion. The major difference is largely a matter of recording and reporting the serious and slight injuries. The mining risk or hazard in one State as a whole does not vary much from that in any other, if the same tonnage of material is handled and an equal number of men employed.

REVISED CLASSIFICATION OF INJURIES FOR 1915 AND 1916.

Many of the States now have compensation laws, and in order to conform with their classifications the bureau's classification of serious and slight injuries for 1915 will be on a 14-day (2-week) basis instead of 20 days, as at present. The new classification of injuries will include three types, as follows:

1. Fatal.
2. Serious (time lost, more than 14 days):
   (*a*) Permanent disability.
      Total.
      Partial.
   (*b*) Others.
3. Slight (time lost, 1 to 14 days, inclusive).

Permanent total disability.—Loss of both legs or arms, one leg and one arm, total loss of eyesight, paralysis or other condition permanently incapacitating workman from doing any work of a gainful occupation.

Permanent partial disability.—Loss of one foot, leg, hand, eye, one or more fingers, one or more toes, any dislocation where ligaments are severed, or any other injury known in surgery to be permanent partial disability.

TABULATED STATISTICS.

The tables of statistics of metal-mine accidents in the United States during the calendar year 1914 follow.

TABLE 1.—*Number of men employed and number of men killed and injured in and about all* ***metal*** *and* ***miscellaneous mineral*** *mines (except coal mines) in the United States during the calendar years 1914 and 1913.*

1914.

Kind of mine.	Active operators.	Number of employees.			Number killed.						Number seriously injured. (Involving loss of 20 days or more.)						Number slightly injured. (Involving loss of less than 20 days, but more than one day.)						Widows.	Orphans.
		Underground.	On the surface.	Total.	Underground.[a]	Rate per 1,000 employed.	On the surface.	Rate per 1,000 employed.	**Total, underground and surface.**	Rate per 1,000 employed.	Underground.[a]	Rate per 1,000 employed.	On the surface.	Rate per 1,000 employed.	**Total, underground and surface.**	Rate per 1,000 employed.	Underground.[a]	Rate per 1,000 employed.	On the surface.	Rate per 1,000 employed.	**Total, underground and surface.**	Rate per 1,000 employed.		
Copper	585	31,265	13,421	44,686	147	4.70	18	1.34	**165**	3.69	1,696	54.25	341	25.41	**2,037**	45.58	9,343	298.83	1,987	148.05	**11,330**	253.55	69	106
Gold and miscellaneous metal	3,536	35,432	13,006	48,438	154	4.35	25	1.92	**179**	3.70	763	21.53	148	11.38	**911**	18.81	3,893	109.87	797	61.28	**4,690**	96.82	60	87
Iron	196	24,847	19,960	44,807	120	4.83	28	1.40	**148**	3.30	1,320	53.13	531	26.60	**1,851**	41.31	5,265	211.90	1,657	83.02	**6,922**	154.48	86	178
Lead and zinc (Mississippi Valley only)	248	7,609	3,326	10,935	37	4.86	3	.90	**40**	3.66	118	15.51	28	8.42	**146**	13.35	1,357	178.34	248	74.56	**1,605**	146.78	23	53
Miscellaneous mineral	240	2,465	6,784	9,249	8	3.25	19	2.80	**27**	2.92	54	21.91	74	10.91	**128**	13.84	188	76.27	408	60.14	**596**	64.44	14	18
Total	**4,805**	**101,618**	**56,497**	**158,115**	**466**		**93**		**559**		**3,951**		**1,122**		**5,073**		**20,046**		**5,097**		**25,143**		**252**	**442**
Average						**4.59**		**1.65**		**3.54**		**38.88**		**19.86**		**32.08**		**197.27**		**90.22**		**159.02**		

1913.

Copper	694	39,917	16,222	56,139	203	5.09	33	2.03	**236**	4.20	1,833	45.92	362	22.32	**2,195**	39.10	9,105	228.10	2,063	127.17	**11,168**	198.93	100	180
Gold and miscellaneous metal	4,749	44,810	14,691	59,501	180	4.02	30	2.04	**210**	3.53	508	11.34	124	8.44	**632**	10.62	2,817	62.87	406	27.64	**3,223**	54.17	67	70
Iron	206	29,384	21,749	51,133	122	4.15	43	1.98	**165**	3.23	2,009	68.37	811	37.29	**2,820**	55.15	7,855	267.32	2,798	128.65	**10,653**	208.34	81	178
Lead and zinc (Mississippi Valley only)	409	9,261	3,436	12,697	32	3.46	10	2.91	**42**	3.31	71	7.67	20	5.82	**91**	7.17	1,070	115.54	275	80.03	**1,345**	105.93	25	46
Miscellaneous mineral	329	2,997	8,809	11,806	11	3.67	19	2.16	**30**	2.54	47	15.68	105	11.92	**152**	12.87	210	70.07	482	54.72	**692**	58.61	13	27
Total	**6,387**	**126,369**	**64,907**	**191,276**	**548**		**135**		**683**		**4,468**		**1,422**		**5,890**		**21,057**		**6,024**		**27,081**		**286**	**501**
Average						**4.34**		**2.08**		**3.57**		**35.36**		**21.91**		**30.79**		**166.63**		**92.81**		**141.58**		

[a] Includes shaft accidents.

TABLE 2.—*Number of men killed and injured in and about all* ***metal*** *and* ***miscella*** *year 1914,*

NUMBER KILLED.

Kind of mine.	Underground.									
	Fall of rock or ore from roof or wall.	Rock or ore while loading at working face.	Timber or hand tools.	Explosives.	Haulage accidents.	Falling down chute, winze, raise, or stope.	Run of ore from chute or pocket.	Drilling accidents.	Electricity.	Machinery (not including locomotives or drills).
	1	2	3	4	5	6	7	8	9	10
Copper	57	2	1	14	10	22	4	1	5	.....
Gold and miscellaneous metal	52	1	.....	22	6	21	1	2	3	.....
Iron	51	3	1	8	13	5	.....	.....	.....	.....
Lead and zinc (Mississippi Valley)	20	1	1	4	.....	.....	.....	.....	.....	1
Miscellaneous mineral	5	.....	.....	1	2	.....	.....	.....	.....	.....
Total	**185**	**7**	**3**	**49**	**31**	**48**	**5**	**3**	**8**	**1**
Percentage of grand total killed	33.09	1.25	.54	8.76	5.55	8.59	.89	.54	1.43	.18
Percentage of class total killed	50.55	1.91	.82	13.39	8.47	13.11	1.37	.82	2.19	.27
Number killed per 1,000 employed underground [a]	1.82	.07	.03	.48	.30	.47	.05	.03	.08	.01

NUMBER SERIOUSLY INJURED.

Copper	486	269	142	41	262	81	36	65	1	9
Gold and miscellaneous metal	259	45	62	37	106	49	15	47	.....	19
Iron	313	115	209	42	267	56	42	53	3	11
Lead and zinc (Mississippi Valley)	51	4	3	6	19	4	.....	3	.....	4
Miscellaneous mineral	9	9	5	4	15	1	.....	7	1	2
Total	**1,118**	**442**	**421**	**130**	**669**	**191**	**93**	**175**	**5**	**45**
Percentage of grand total seriously injured	22.04	8.71	8.30	2.56	13.19	3.76	1.83	3.45	.10	.89
Percentage of class total seriously injured	29.69	11.74	11.18	3.45	17.76	5.07	2.47	4.65	.13	1.19
Number seriously injured per 1,000 employed underground [a]	11.00	4.35	4.14	1.28	6.58	1.88	.92	1.72	.05	.44

NUMBER SLIGHTLY INJURED.

Copper	2,529	1,634	961	84	1,081	353	282	515	20	51
Gold and miscellaneous metal	966	427	466	35	503	174	131	369	4	45
Iron	1,219	762	793	43	843	86	137	320	17	42
Lead and zinc (Mississippi Valley)	252	235	69	38	174	16	6	87	3	18
Miscellaneous mineral	20	53	20	4	33	3	.....	22	3	3
Total	**4,986**	**3,111**	**2,309**	**204**	**2,634**	**632**	**556**	**1,313**	**47**	**159**
Percentage of grand total slightly injured	19.83	12.37	9.18	.81	10.48	2.51	2.21	5.22	.19	.63
Percentage of class total slightly injured	25.53	15.93	11.82	1.04	13.49	3.24	2.85	6.72	.24	.81
Number slightly injured per 1,000 employed underground [a]	49.07	30.62	22.72	2.01	25.92	6.22	5.47	12.92	.46	1.56

[a] Casualty rate per 1,000 employed is based on underground employees for underground accidents, and on surface employees for surface accidents.

neous mineral *mines (except coal mines) in the United States during the calendar by causes.*

NUMBER KILLED.

Underground—Continued.						Shaft.						
Mine fires.	Suffocation from natural gases.	Inrush of water.	Stepping on nail.	Other causes.	**Total, underground.**	Falling down shafts.	Objects falling down shafts.	Breaking of cables.	Overwinding.	Skip or cage.	Other causes.	**Total, shaft.**
11	12	13	14	15		16	17	18	19	20	21	
2				1	119	8	2			15	3	28
4	1			3	116	13	2	2		19	2	38
2		8		2	93	10	4			7	6	27
2				1	30	3	2			2		7
					8							
10	**1**	**8**		**7**	**366**	**34**	**10**	**2**		**43**	**11**	**100**
1.79	.18	1.43		1.25	65.47	6.08	1.79	.36		7.70	1.96	17.89
2.73	.27	2.19		1.91	100.00	34.00	10.00	2.00		43.00	11.00	100.00
.10	.01	.08		.07	3.60	.33	.10	.02		.42	.11	.98

NUMBER SERIOUSLY INJURED.

			4	226	1,622	8	12			30	24	74
4			2	74	719	6	6	3		18	11	44
	3		6	145	1,265	8	9		1	24	13	55
				12	106	3	3			4	2	12
				1	54							
4	**3**		**12**	**458**	**3,766**	**25**	**30**	**3**	**1**	**76**	**50**	**185**
.08	.06		.23	9.03	74.23	.49	.59	.06	.02	1.50	.99	3.65
.11	.08		.32	12.16	100.00	13.51	16.22	1.62	.54	41.08	27.03	100.00
.04	.03		.12	4.51	37.06	.24	.30	.03	.01	.75	.49	1.82

NUMBER SLIGHTLY INJURED.

1	3		104	1,553	9,171	8	59			60	45	172
1	11		34	630	3,796	9	33	6	1	25	23	97
	5	12	74	756	5,109	4	39		1	62	50	156
			8	363	1,269	4	21			35	28	88
			2	23	186					2		2
2	**19**	**12**	**222**	**3,325**	**19,531**	**25**	**152**	**6**	**2**	**184**	**146**	**515**
.01	.08	.05	.88	13.23	77.68	.10	.61	.02	.01	.73	.58	2.05
.01	.10	.06	1.14	17.02	100.00	4.85	29.51	1.17	.39	35.73	28.35	100.00
.02	.19	.12	2.18	32.72	192.20	.25	1.49	.06	.02	1.81	1.44	5.07

TABLE 2.—*Number of men killed and injured in and about all* ***metal*** *and* ***miscellane*** *by causes—*

NUMBER KILLED.

Kind of mine.	Surface (shops and power plants).									
	Mine cars, mine locomotives, or aerial trams.	Railway cars and locomotives.	Run or fall of ore in or from ore bins.	Falls of persons.	Stepping on nail.	Hand tools, axes, bars, etc.	Electricity.	Machinery.	Other causes.	Total, surface.
	22	23	24	25	26	27	28	29	30	
Copper	2	2	.....	1	.....	.....	.....	.....	3	8
Gold and miscellaneous metal	.....	2	2	.....	.....	.....	3	2	2	11
Iron	1	1	2	3	.....	.....	1	1	2	11
Lead and zinc (Mississippi Valley)	.....	.....	.....	.....	.....	.....	.....	1	1	2
Miscellaneous mineral	.....	2	1	.....	.....	.....	2	.....	.....	5
Total	**3**	**7**	**5**	**4**	.....	.....	**8**	**4**	**8**	**37**
Percentage of grand total killed	.54	1.25	.89	.72	.....	.....	1.07	.72	1.43	6.62
Percentage of class total killed	8.11	18.92	13.51	10.81	.....	.....	16.21	10.81	21.62	100.00
Number killed per 1,000 employed on the surface[a]	.05	.12	.09	.07	.....	.....	.11	.07	.14	.65

NUMBER SERIOUSLY INJURED.

Copper	24	4	10	32	4	44	2	34	70	224
Gold and miscellaneous metal	10	2	3	10	.....	13	1	26	24	85
Iron	30	10	4	60	3	29	.....	38	72	246
Lead and zinc (Mississippi Valley)	2	1	2	4	1	5	.....	6	7	28
Miscellaneous mineral	.....	1	2	5	.....	1	.....	3	8	20
Total	**66**	**18**	**21**	**111**	**8**	**92**	**3**	**107**	**181**	**607**
Percentage of grand total seriously injured	1.30	.36	.41	2.19	.16	1.81	.06	2.11	3.57	11.97
Percentage of class total seriously injured	10.87	2.96	3.46	18.29	1.32	15.16	.49	17.63	29.82	100.00
Number seriously injured per 1,000 employed on the surface[a]	1.17	.32	.37	1.97	.14	1.63	.05	1.89	3.20	10.74

NUMBER SLIGHTLY INJURED.

Copper	81	18	30	68	38	144	8	73	302	762
Gold and miscellaneous metal	35	26	11	39	19	80	5	45	181	441
Iron	54	20	18	136	52	156	7	76	365	884
Lead and zinc (Mississippi Valley)	12	6	9	12	14	34	2	18	139	246
Miscellaneous mineral	9	5	6	21	14	20	1	14	86	176
Total	**191**	**75**	**74**	**276**	**137**	**434**	**23**	**226**	**1,073**	**2,509**
Percentage of grand total slightly injured	.76	.30	.29	1.10	.54	1.73	.09	.90	4.27	9.98
Percentage of class total slightly injured	7.61	2.99	2.95	11.00	5.46	17.30	.92	9.01	42.76	100.00
Number slightly injured per 1,000 employed on the surface[a]	3.38	1.33	1.31	4.89	2.42	7.68	.41	4.00	18.99	44.41

[a] Casualty rate per 1,000 employed is based on underground employees for underground accidents, and on surface employees for surface accidents.

***ous mineral** mines (except coal mines) in the United States during the calendar year 1914,* Continued.

NUMBER KILLED.

Open pit.												Grand total.			
Falls or slides of rock or ore.	Explosives.	Haulage accidents (locomotives, etc.).	Steam shovels.	Falls of persons.	Falls of derricks, booms, etc.	Run or fall of ore in or from ore bins.	Machinery (other than locomotives or steam shovels).	Electricity.	Hand tools.	Other causes.	Total, open pit.				
31	32	33	34	35	36	37	38	39	40	41		1914	1913	1912	1911
1	6	3	.....	.....	.....	.....	.....	.....	.....	.....	10	165	236	239	238
3	3	1	.....	2	1	.....	1	2	.....	1	14	179	210	176	193
7	2	5	1	1	.....	.....	1	.....	.....	.....	17	148	165	172	197
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	40	42	54	43
7	.....	.....	.....	1	.....	.....	3	1	.....	2	14	27	30	20	24
18	**11**	**9**	**1**	**4**	**1**	.....	**5**	**3**	.....	**4**	**56**	**559**	**683**	**661**	**695**
3.22	1.96	1.61	.18	.72	.18	.....	.89	.54	.....	.72	10.02	100.00	.....	.....	.....
32.14	19.64	16.07	1.79	7.14	1.79	.....	8.93	5.36	.....	7.14	100.00	.....	.....	.....	.....
.32	.19	.16	.02	.07	.02	.....	.09	.05	.....	.07	.99	3.54	3.57	3.91	4.19

NUMBER SERIOUSLY INJURED.

21	17	25	5	6	1	.....	10	2	4	26	117	2,037	2,195	1,807	1,326
2	4	1	.....	10	.....	.....	19	.....	9	14	59	911	632	613	540
52	17	43	27	24	4	.....	6	.....	25	87	285	1,851	2,820	1,800	2,032
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	146	91	147	177
13	.....	9	.....	3	3	.....	9	.....	6	11	54	128	152	135	94
88	**38**	**78**	**32**	**43**	**8**	.....	**44**	**2**	**44**	**138**	**515**	**5,073**	**5,890**	**4,502**	**4,169**
1.73	.75	1.53	.63	.85	.16	.....	.86	.04	.86	2.74	10.15	100.00	.....	.....	.....
17.09	7.38	15.15	6.21	8.35	1.55	.....	8.54	.39	8.54	26.80	100.00	.....	.....	.....	.....
1.56	.67	1.38	.57	.76	.14	.....	.78	.04	.78	2.44	9.12	32.08	30.79	26.61	25.12

NUMBER SLIGHTLY INJURED.

282	67	137	47	140	.....	1	50	2	88	411	1,225	11,330	11,168	11,830	9,016
43	1	6	.....	22	.....	5	78	3	111	87	356	4,690	3,223	3,180	3,078
91	18	83	73	77	5	.....	13	.....	115	298	773	6,922	10,653	8,707	8,690
1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	2	1,605	1,345	1,849	1,311
36	6	25	1	15	1	2	23	1	32	90	232	596	692	666	313
453	**92**	**251**	**121**	**255**	**6**	**8**	**164**	**6**	**346**	**886**	**2,588**	**25,143**	**27,081**	**26,232**	**22,408**
1.80	.37	1.00	.48	1.02	.02	.03	.65	.02	1.38	3.52	10.29	100.00	.....	.....	.....
17.50	3.55	9.70	4.68	9.85	.23	.31	6.34	.23	13.37	34.24	100.00	.....	.....	.....	.....
8.02	1.63	4.44	2.14	4.51	.11	.14	2.90	.11	6.13	15.68	45.81	159.02	141.58	155.04	135.01

TABLE 3.—*Number of men killed in and about all* ***metal*** *and* ***miscellaneous mineral***

State.	Underground.									
	Fall of rock or ore from roof or wall.	Rock or ore while loading at working face.	Timber or hand tools.	Explosives.	Haulage accidents.	Falling down chute, winze, raise, or stope.	Run of ore from chute or pocket.	Drilling accidents.	Electricity.	Machinery (not including locomotives or drills).
	1	2	3	4	5	6	7	8	9	10
Alabama	10			4	7					
Alaska	5			2		5				
Arizona	27			10	5	6	2	1	2	
Arkansas and Louisiana										
California	5			11		3		2		
Colorado	16			3		10	1		1	
Connecticut										
Florida										
Georgia										
Idaho	7			2	5	2			1	
Illinois										
Iowa										
Kansas	1									
Kentucky										
Maine										
Maryland										
Massachusetts										
Michigan	40	2		3	6	5	1			
Minnesota	11	1	1	2	2					
Missouri	13	1		1						1
Montana	12		1	3		10			2	
Nevada	6			1		2			1	
New Hampshire										
New Jersey				1		1				
New Mexico										
New York	5	2			2					
North Carolina	2			1						
Ohio										
Oklahoma	1		1							
Oregon										
Pennsylvania										
South Carolina										
South Dakota	2				1					
Tennessee	4	1		1		3				
Texas										
Utah	13			1	3		1		1	
Vermont										
Virginia										
Washington										
Wisconsin	5			3		1				
Wyoming										
Total, 1914	**185**	**7**	**3**	**49**	**31**	**48**	**5**	**3**	**8**	**1**
Total, 1913	220	10	8	77	35	52	10		16	4
Total, 1912	212	2	6	73	35	43	10	2	19	2
Total, 1911	191		10	62	20	47	14		15	10

mines (except coal mines) in the different States during the calendar year 1914, by causes.

Underground—Continued.						Shaft.						
Mine fires.	Suffocation from natural gases.	Inrush of water.	Stepping on nail.	Other causes.	**Total, underground.**	Falling down shafts.	Objects falling down shafts.	Breaking of cables.	Overwinding.	Skip or cage.	Other causes.	**Total, shaft.**
11	12	13	14	15		16	17	18	19	20	21	
				2	**23**							
	1				**13**			1		1		2
					53	5				3	1	**9**
3					**24**	1				5	1	**7**
					31	4	1	1		6		**12**
1				1	**19**	2	1			1		**4**
					1							
2					**2**							
2		8			**67**	8	4			12	2	**26**
					17	2	1			1	5	**9**
				1	**17**	2	2			1		**5**
				1	**29**	1				5		**6**
				2	**12**	1				1		**2**
					2	2						**2**
										2		**2**
					9					1	1	**2**
					3	3						**3**
					2	1						**1**
										1		**1**
					3							
					9	1					1	**2**
2					**21**	1				2		**3**
					9		1			1		**2**
10	**1**	**8**		**7**	**366**	**34**	**10**	**2**		**43**	**11**	**100**
	3			**23**	**458**	26	15	2	3	34	10	**90**
1	**4**	5		8	**422**	40	12	2		37	9	**100**
37	**8**	12		10	**436**	57	18	4			27	**106**

TABLE 3.—*Number of men killed in and about all* ***metal*** *and* ***miscellaneous min***
by causes—

State.	Surface.									
	Mine cars, mine locomotives, or aerial trams.	Railway cars and locomotives.	Run or fall of ore in or from ore bins.	Falls of persons.	Stepping on nail.	Hand tools, axes, bars, etc.	Electricity.	Machinery.	Other causes.	**Total, surface.**
	22	23	24	25	26	27	28	29	30	
Alabama				1						**1**
Alaska										
Arizona	1									**1**
Arkansas and Louisiana.			1							**1**
California		1	2				1	1	1	**5**
Colorado		1					1	1	1	**4**
Connecticut										
Florida		1					1			**2**
Georgia										
Idaho							1			**1**
Illinois										
Iowa										
Kansas										
Kentucky										
Maine										
Maryland										
Massachusetts										
Michigan	1	1					1		3	**6**
Minnesota			2	2						**4**
Missouri								1	1	**2**
Montana	1			1						**2**
Nevada		1								**1**
New Hampshire										
New Jersey										
New Mexico										
New York										
North Carolina									1	**1**
Ohio										
Oklahoma										
Oregon										
Pennsylvania										
South Carolina										
South Dakota										
Tennessee							1	1		**2**
Texas										
Utah		1							1	**2**
Vermont										
Virginia		1								**1**
Washington										
Wisconsin										
Wyoming										
Total, 1914	**3**	**7**	**5**	**4**			**6**	**4**	**8**	**37**
Total, 1913	9	4	2	5	1		5	11	12	49
Total, 1912	6	5	2	6			5	11	24	59
Total, 1911	4	8	3				2	8	42	67

***eral** mines (except coal mines) in the different States during the calendar year 1914,* Continued.

Open pit.												Grand total.			
Falls or slides of rock or ore.	Explosives.	Haulage accidents (locomotives, etc.).	Steam shovels.	Falls of persons.	Falls of derricks, booms, etc.	Run or fall of ore in or from ore bins.	Machinery (other than locomotives or steam shovels).	Electricity.	Hand tools.	Other causes.	Total, open pit.				
31	32	33	34	35	36	37	38	39	40	41		1914	1913	1912	1911
.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	1	25	22	33	10
2	.....	.....	.....	.....	1	.....	.....	.....	.....	1	4	19	25	21	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	63	86	67	70
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	1	3
1	1	.....	.....	1	.....	.....	1	.....	.....	.....	4	41	52	40	38
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	47	44	48	43
2	.....	.....	.....	1	.....	.....	2	1	.....	2	8	10	14	6	9
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	1	.....	2
.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	1	25	24	29	23
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	1
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	4	2	2
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	1	3
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	99	82	96	134
4	2	5	1	1	.....	.....	.....	.....	.....	.....	13	43	63	50	76
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	25	34	36	38
.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	2	39	64	50	62
.....	6	1	.....	.....	.....	.....	.....	.....	.....	.....	7	22	25	34	50
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	8	13	23
2	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	5	28	13	11
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	11	14	17	10
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	8	4	1	4
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	1	2	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	3	1	2
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	1
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	4	8	6	8
4	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	5	18	10	12	10
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....
1	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	3	29	36	41	49
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	2	.....
.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	1	2	12	4	6
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	4	3
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	11	11	22	3
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....
18	11	9	1	4	1	.....	5	3	.....	4	56	559	.....	.....	.....
17	12	30	2	1	1	.....	10	5	.....	8	86	.....	683	.....	.....
16	21	20	4	3	2	.....	6	1	.....	7	80	.....	.....	661	.....
35	16	21	1	3	1	.....	3	.....	.....	6	86	.....	.....	.....	695

TABLE 4.—*Number of men* ***killed*** *in and about the various groups*

COPPER MINES.

State.	Underground.									
	Fall of rock or ore from roof or wall.	Rock or ore while loading at working face.	Timber or hand tools.	Explosives.	Haulage accidents.	Falling down chute, winze, raise, or stope.	Run of ore from chute or pocket.	Drilling accidents.	Electricity.	Machinery (not including locomotives or drills).
	1	2	3	4	5	6	7	8	9	10
Alaska						2				
Arizona	25			8	5	5	2	1	2	
California				1		1				
Idaho	2			1						
Michigan	16	2		2	2	1	1			
Montana	11		1	1		10			2	
Nevada										
New Mexico										
Utah	1			1	3		1		1	
Washington										
Other States [a]	2					3				
Total, 1914	**57**	**2**	**1**	**14**	**10**	**22**	**4**	**1**	**5**	
Total, 1913	76	2	1	23	20	25	6		6	
Total, 1912	87		4	21	9	16	6	1	9	
Total, 1911	82		6	18	5	19	6		6	3

GOLD AND MISCELLANEOUS METAL MINES.

Alaska	5			2		3				
Arizona	2			2		1				
California	5			10		2		2		
Colorado	14			3		10	1		1	
Georgia										
Idaho	5			1	5	2			1	
Montana	1			2						
Nevada	6			1		2			1	
New Mexico										
New York										
North Carolina										
Oregon										
South Dakota	2				1					
Tennessee		1		1						
Texas										
Utah	12									
Virginia										
Washington										
Wyoming										
Other States [b]						1				
Total, 1914	**52**	**1**		**22**	**6**	**21**	**1**	**2**	**3**	
Total, 1913	68	1	3	35	2	21	2		5	4
Total, 1912	49	1	1	27	7	17	2		5	
Total, 1911	40		2	24	7	18	6		7	5

[a] Includes Colorado, Maryland, Oregon, South Dakota, Tennessee, and Wyoming.
[b] Includes Alabama, Arkansas, Maryland, New Jersey, and South Carolina.

of mines in the United States during the calendar year 1914, by causes.

COPPER MINES.

Underground—Continued.						Shaft.						
Mine fires.	Suffocation from natural gases.	Inrush of water.	Stepping on nail.	Other causes.	**Total, underground.**	Falling down shafts.	Objects falling down shafts.	Breaking of cables.	Overwinding.	Skip or cage.	Other causes.	**Total, shaft.**
11	12	13	14	15		16	17	18	19	20	21	
					2							
					48	4				3	1	8
					2							
					3							
					24	2	2			7	2	13
				1	26	1				4		5
2					9					1		1
					5	1						1
2				**1**	**119**	**8**	**2**			**15**	**3**	**28**
				12	171	9	7		1	9	6	32
	1			3	157	11	2			14	1	28
12	2			1	160	17	5				17	39

GOLD AND MISCELLANEOUS METAL MINES.

	1				11			1		1		2
					5	1						1
3					22	1				5	1	7
					29	4	1	1		6		12
1				1	16	2	1			1		4
					3					1		1
				2	12	1				1		2
										2		2
						3						3
										1		1
					3							
					2						1	1
					12	1				1		2
					1							
4	**1**			**3**	**116**	**13**	**2**	**2**		**19**	**2**	**38**
	3			6	150	10	5			13	2	30
1	3			1	114	16	2	2		10	3	33
17	5			2	133	16	8	3			3	30

TABLE 4.—*Number of men* ***killed*** *in and about the various groups of*

COPPER MINES.

State.	Surface.									
	Mine cars, mine locomotives, or aerial trams.	Railway cars and locomotives.	Run or fall of ore in or from ore bins.	Falls of persons.	Stepping on nail.	Hand tools, axes, bars, etc.	Electricity.	Machinery.	Other causes.	**Total, surface.**
	22	23	24	25	26	27	28	29	30	
Alaska										
Arizona	1									**1**
California									1	**1**
Idaho										
Michigan		1							2	**3**
Montana	1			1						**2**
Nevada										
New Mexico										
Utah		1								**1**
Washington										
Other States [a]										
Total, 1914	2	2		1					3	**8**
Total, 1913	1	2					2	3	1	**9**
Total, 1912	1	5		4			3	3	15	**31**
Total, 1911		3	1				1	3	14	**22**

GOLD AND MISCELLANEOUS METAL MINES.

Alaska										
Arizona										
California			2				1	1		**4**
Colorado		1					1	1	1	**4**
Georgia										
Idaho							1			**1**
Montana										
Nevada		1								**1**
New Mexico										
New York										
North Carolina										
Oregon										
South Dakota										
Tennessee										
Texas										
Utah									1	**1**
Virginia										
Washington										
Wyoming										
Other States [b]										
Total, 1914		2	2				3	2	2	**11**
Total, 1913	2	1		2	1		1	5	6	**18**
Total, 1912	3						1	5	3	**12**
Total, 1911	3		1				1	3	17	**25**

[a] Includes Colorado, Maryland, Oregon, South Dakota, Tennessee, and Wyoming.
[b] Includes Alabama, Arkansas, Maryland, New Jersey, and South Carolina.

mines (by causes) in the United States in the calendar year 1914—Continued.

COPPER MINES.

Open pit.												Grand total.			
Falls or slides of rock or ore.	Explosives.	Haulage accidents (locomotives, etc.).	Steam shovels.	Falls of persons.	Falls of derricks, booms, etc.	Run or fall of ore in or from ore bins.	Machinery (other than locomotives or steam shovels).	Electricity.	Hand tools.	Other causes.	Total, open pit.				
31	32	33	34	35	36	37	38	39	40	41		1914	1913	1912	1911
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	12	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	57	74	60	61
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	9	9	2
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	3	1	3
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	40	34	44	63
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	33	60	48	50
.....	5	1	.....	.....	.....	.....	.....	.....	.....	.....	6	6	10	18	12
.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	16	8	4
1	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	3	14	25	27	32
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	1	2
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	3	11	9
1	6	3	.....	.....	.....	.....	.....	.....	.....	.....	10	165	.....	.....	.....
4	6	12	.....	.....	.....	.....	2	.....	.....	.....	24	.....	236	.....	.....
3	13	4	2	.....	.....	.....	.....	.....	.....	1	23	.....	.....	239	.....
7	5	2	.....	1	.....	.....	2	.....	.....	.....	17	.....	.....	.....	238

GOLD AND MISCELLANEOUS METAL MINES.

2	.....	.....	.....	.....	1	.....	.....	.....	.....	1	4	17	25	9	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	12	7	8
1	1	.....	.....	1	.....	.....	1	.....	.....	.....	4	37	42	31	36
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	45	44	46	43
.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	1	22	21	28	20
.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	2	6	4	2	12
.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	16	15	16	37
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	9	3	4
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	2	1	2
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	3	1	2
.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	4	8	6	8
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	3	2	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	15	9	12	17
.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	1	1	7	2	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	3	1
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	3	7	3
3	3	1	.....	2	1	.....	1	2	.....	1	14	179	.....	.....	.....
1	2	1	.....	.....	1	.....	3	2	.....	2	12	.....	210	.....	.....
5	1	4	2	1	.....	.....	1	1	.....	2	17	.....	.....	176	.....
3	.....	.....	.....	1	.....	.....	.....	.....	.....	1	5	.....	.....	.....	193

TABLE 4.—*Number of men* ***killed*** *in and about the various groups of*

IRON MINES.

State.	Underground.									
	Fall of rock or ore from roof or wall.	Rock or ore while loading at working face.	Timber or hand tools.	Explosives.	Haulage accidents.	Falling down chute, winze, raise, or stope.	Run of ore from chute or pocket.	Drilling accidents.	Electricity.	Machinery (not including locomotives or drills).
	1	2	3	4	5	6	7	8	9	10
Alabama	10			4	7					
Michigan	23			1	4	4				
Minnesota	11	1	1	2	2					
Missouri										
New Jersey				1						
New York	3	2								
Pennsylvania										
Tennessee	2									
Virginia										
Wisconsin						1				
Other States [a]	2									
Total, 1914	**51**	**3**	**1**	**8**	**13**	**5**				
Total, 1913	52	7	3	11	12	4	2		4	
Total, 1912	55	1	1	15	17	9	1	1	2	2
Total, 1911	45		1	11	6	10	2			2

LEAD AND ZINC MINES.

Illinois										
Kansas	1									
Missouri	13	1		1						1
Oklahoma	1		1							
Wisconsin	5			3						
Other States [b]										
Total, 1914	**20**	**1**	**1**	**4**						**1**
Total, 1913	16		1	7	1	1			1	
Total, 1912	18			9	1	1	1		3	
Total, 1911	18		1	3	2				2	

MISCELLANEOUS MINERAL MINES.

All States, 1914	**5**			**1**	**2**					
All States, 1913	8			1		1				
All States, 1912	3			1	1					
All States, 1911	6			6						

[a] Includes Arizona, California, Connecticut, Georgia, Idaho, Kentucky, Maryland, Massachusetts, Montana, Nevada, New Mexico, North Carolina, Ohio, Utah, Washington, and Wyoming.
[b] Includes Arkansas and Kentucky.

mines in the United States during the calendar year 1914, by causes—Continued.

IRON MINES.

Underground—Continued.						Shaft.						
Mine fires.	Suffocation from natural gases.	Inrush of water.	Stepping on nail.	Other causes.	**Total, underground.**	Falling down shafts.	Objects falling down shafts.	Breaking of cables.	Overwinding.	Skip or cage.	Other causes.	**Total, shaft.**
11	12	13	14	15		16	17	18	19	20	21	
				2	**23**							
2		8			**42**	6	2			5		**13**
					17	2	1			1	5	**9**
					1	2						**2**
					5					1	1	**2**
					2							
					1		1					**1**
					2							
2		**8**		**2**	**93**	**10**	**4**			**7**	**6**	**27**
				3	**98**	6	2	2	1	11	2	**24**
		5		2	**111**	7	4			13	1	**25**
8	1	12		5	**103**	23	3	1			6	**33**

LEAD AND ZINC MINES.

					1							
				1	**17**	2	2			1		**5**
					2	1						**1**
					8					1		**1**
2					**2**							
2				**1**	**30**	**3**	**2**			**2**		**7**
				1	**28**	1	1		1	1		**4**
				2	**35**	5	4				4	**13**
				2	**28**	1	2				1	**4**

MISCELLANEOUS MINERAL MINES.

					8							
				1	**11**							
					5	1						**1**
					12							

TABLE 4.—*Number of men* ***killed*** *in and about the various groups of* IRON MINES.

State.	Surface.									
	Mine cars, mine locomotives, or aerial trams.	Railway cars and locomotives.	Run or fall of ore in or from ore bins.	Falls of persons.	Stepping on nail.	Hand tools, axes, bars, etc.	Electricity.	Machinery.	Other causes.	Total, surface.
	22	23	24	25	26	27	28	29	30	
Alabama				1						1
Michigan	1						1		1	3
Minnesota			2	2						4
Missouri										
New Jersey										
New York										
Pennsylvania										
Tennessee								1		1
Virginia		1								1
Wisconsin										
Other States [a]									1	1
Total, 1914	1	1	2	3			1	1	2	11
Total, 1913	4		2	3			1	1	4	15
Total, 1912	2		2	2			1	1	1	9
Total, 1911	1	2	1					2	4	10

LEAD AND ZINC MINES.

Illinois										
Kansas										
Missouri								1	1	2
Oklahoma										
Wisconsin										
Other States [b]										
Total, 1914								1	1	2
Total, 1913	2	1					1	2		6
Total, 1912								1	4	5
Total, 1911		3							7	10

MISCELLANEOUS MINERAL MINES.

All States, 1914		2	1				2			5
All States, 1913									1	1
All States, 1912								1	1	2
All States, 1911										

[a] Includes Arizona, California, Connecticut, Georgia, Idaho, Kentucky, Maryland, Massachusetts, Montana, Nevada, New Mexico, North Carolina, Ohio, Utah, Washington, and Wyoming.
[b] Includes Arkansas and Kentucky.

mines in the United States during the calendar year 1914, by causes—Continued.

IRON MINES.

Open pit.											Grand total.			
Falls or slides of rock or ore.	Explosives.	Haulage accidents (locomotives, etc.).	Steam shovels.	Falls of persons.	Falls of derricks, booms, etc.	Run or fall of ore in or from ore bins.	Machinery (other than locomotives or steam shovels).	Electricity.	Hand tools.	Other causes.	Total, open pit.				
31	32	33	34	35	36	37	38	39	40	41		1914	1913	1912	1911
.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	1	25	22	32	10
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	58	47	52	69
4	2	5	1	1	.....	.....	.....	.....	.....	.....	13	43	63	50	76
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	5	7	20
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7	12	14	6
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	1
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	4	1	1	2
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	3	2	5
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	9	9	2
2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	5	3	3	5
7	2	5	1	1	.....	.....	1	.....	.....	.....	17	148	.....	.....	.....
8	3	11	2	1	.....	.....	2	1	.....	.....	28	.....	165	.....	.....
5	5	11	.....	1	2	.....	2	.....	.....	1	27	.....	.....	172	.....
22	10	14	1	.....	1	.....	.....	.....	.....	3	51	.....	.....	.....	197

LEAD AND ZINC MINES.

.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	1
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	4	2	2
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	25	34	36	37
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	1	1	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9	2	13	1
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	1	2
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	40	.....	.....	.....
1	1	.....	.....	.....	.....	.....	1	.....	.....	1	4	.....	42	.....	.....
.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	1	.....	.....	54	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	.....	.....	.....	43

MISCELLANEOUS MINERAL MINES.

7	.....	.....	.....	1	.....	.....	3	1	.....	2	14	27	.....	.....	.....
3	.....	6	.....	.....	.....	.....	2	2	.....	5	18	.....	30	.....	.....
3	2	1	.....	1	.....	.....	2	.....	.....	3	12	.....	.....	20	.....
3	1	5	.....	1	.....	.....	.....	1	.....	1	12	.....	.....	.....	24

TABLE 5.—*Number of men employed, number of days worked, and number of men killed per 1,000 employed in and about all* ***metal*** *and* ***miscellaneous mineral*** *mines (except coal mines) in the different States during the calendar year 1914.*

State.	Number of active operators.	Number of employees.			Days' work done.	Average number of days worked.	Number killed.						Widows.	Orphans.
		Underground.	On the surface.	Total.			Underground.[a]	Per 1,000 employed.	On the surface.	Per 1,000 employed.	Total.	Per 1,000 employed.		
Alabama	21	3,018	2,207	5,225	1,431,218	274	23	7.62	2	0.91	25	4.78	15	29
Alaska	350	6,225	1,775	8,000	2,052,450	257	15	2.41	4	2.25	19	2.38	2	5
Arizona	346	10,700	3,311	14,011	4,361,024	311	62	5.79	1	.30	63	4.50	24	36
Arkansas and Louisiana	7	15	457	472	111,502	236	.....	.....	1	2.19	1	2.12	1	.....
California	851	5,787	3,974	9,761	2,727,281	279	31	5.36	10	2.52	41	4.20	11	16
Colorado	412	7,493	1,735	9,228	2,768,100	300	43	5.74	4	2.31	47	5.09	18	15
Connecticut	6	125	91	216	38,975	180	.....	.....	.....	.....	.....	.....	.....	.....
Florida	18	.....	2,885	2,885	679,182	235	.....	.....	10	3.47	10	3.47	4	1
Georgia	18	66	239	305	48,386	159	.....	.....	1	4.18	1	3.28	.....	.....
Idaho	526	3,979	1,270	5,249	1,366,877	260	23	5.78	2	1.57	25	4.76	11	11
Illinois	8	292	198	490	104,462	213	.....	.....	.....	.....	.....	.....	.....	.....
Iowa	7	254	27	281	62,883	224	.....	.....	.....	.....	.....	.....	.....	.....
Kansas	24	210	105	315	67,386	214	1	4.76	.....	.....	1	3.17	1	1
Kentucky	11	57	164	221	30,487	138	2	35.09	.....	.....	2	9.05	2	3
Maine	4	.....	128	128	30,389	237	.....	.....	.....	.....	.....	.....	.....	.....
Maryland	12	16	53	69	13,850	201	.....	.....	.....	.....	.....	.....	.....	.....
Massachusetts	3	22	9	31	8,463	273	.....	.....	.....	.....	.....	.....	.....	.....
Michigan	80	19,013	8,259	27,272	7,472,852	274	93	4.89	6	.73	99	3.63	56	106
Minnesota	57	7,886	9,808	17,694	4,399,549	249	26	3.30	17	1.73	43	2.43	22	52
Missouri	172	5,915	2,565	8,480	2,180,531	257	22	3.72	3	1.17	25	2.95	16	47
Montana	302	10,326	2,720	13,046	3,386,894	260	35	3.39	4	1.47	39	2.99	13	8
Nevada	450	4,671	2,150	6,821	2,030,527	298	14	3.00	8	3.72	22	3.23	8	11
New Hampshire	5	17	21	38	8,574	226	.....	.....	.....	.....	.....	.....	.....	.....
New Jersey	7	989	373	1,362	404,054	297	4	4.04	.....	.....	4	2.93	4	11
New Mexico	118	1,009	1,415	2,424	643,005	265	2	1.98	3	2.12	5	2.06	2	3
New York	34	2,194	808	3,002	833,826	278	11	5.01	.....	.....	11	3.66	7	8
North Carolina	30	517	477	994	218,973	220	6	11.61	2	4.19	8	8.05	6	17
Ohio	4	173	19	192	50,604	264	.....	.....	.....	.....	.....	.....	.....	.....
Oklahoma	23	371	225	596	151,616	254	3	8.09	.....	.....	3	5.03	3	2
Oregon	225	718	561	1,279	208,531	163	1	1.39	.....	.....	1	.78	.....	.....
Pennsylvania	22	80	345	425	104,553	246	.....	.....	.....	.....	.....	.....	.....	.....
South Carolina	5	7	409	416	77,088	185	.....	.....	.....	.....	.....	.....	.....	.....
South Dakota	60	1,446	395	1,841	582,731	317	3	2.07	1	2.53	4	2.17	3	6
Tennessee	27	1,357	1,896	3,253	767,793	236	11	8.11	7	3.69	18	5.53	7	19
Texas	7	237	109	346	104,000	301	.....	.....	.....	.....	.....	.....	.....	.....
Utah	234	3,252	2,585	5,837	1,869,201	320	24	7.38	5	1.93	29	4.97	12	26
Vermont	5	76	36	112	29,698	265	.....	.....	.....	.....	.....	.....	.....	.....
Virginia	25	638	1,239	1,877	498,414	266	.....	.....	2	1.61	2	1.07	1	2
Washington	188	561	304	865	118,113	137	.....	.....	.....	.....	.....	.....	.....	.....

Wisconsin	38	1,658	918	2,576	643,464	250	11	6.63	.....	.....	11	4.27	3	7
Wyoming	60	248	232	480	98,034	204	.....	.....	.....	.....	.....	.....	.....	.....
Total 1914	**4,805**	**101,618**	**56,497**	**158,115**	**42,785,840**	**271**	**466**	**4.59**	**93**	**1.65**	**559**	**3.54**	**252**	**442**
Total, 1913	6,387	126,369	64,907	191,276	55,077,855	288	548	4.34	135	2.08	683	3.57	286	501
Total, 1912	5,967	110,056	59,143	169,199	48,498,510	287	522	4.74	139	2.35	661	3.91	273	520
Total, 1911	5,232	104,623	61,356	165,979	46,826,573	282	542	5.18	153	2.49	695	4.19	297	600

[a] Includes shaft accidents.

TABLE 6.—*Number of men employed, number of days worked, and number of men killed per 1,000 employed in and about the* ***copper*** *mines in the United States during the calendar year 1914.*

State.	Number of active operators.	Number of employees.			Days' work done.	Average number of days worked.	Number killed.						Widows.	Orphans.
		Underground.	On the surface.	Total.			Underground.[a]	Per 1,000 employed.	On the surface.	Per 1,000 employed.	**Total.**	Per 1,000 employed.		
Alaska	23	339	279	618	160,800	260	2	5.90	.....	.....	**2**	3.24	1	2
Arizona	142	9,390	2,739	12,129	3,902,761	322	56	5.96	1	0.37	**57**	4.70	24	36
California	36	817	396	1,213	321,865	265	2	2.45	1	2.53	**3**	2.47	.....	.....
Idaho	60	450	106	556	138,910	250	3	6.67	.....	.....	**3**	5.40	1	1
Michigan	29	8,767	3,622	12,389	3,361,156	271	37	4.22	3	.83	**40**	3.23	20	36
Montana	49	8,360	2,064	10,424	2,744,236	263	31	3.71	2	.97	**33**	3.17	12	7
Nevada	54	567	680	1,247	347,111	278	.....	.....	6	8.82	**6**	4.81	4	8
New Mexico	28	343	1,110	1,453	412,353	284	.....	.....	1	.90	**1**	.69	1	1
Utah	58	1,291	2,110	3,401	1,177,015	346	10	7.75	4	1.90	**14**	4.12	4	5
Washington	57	223	89	312	48,452	155	.....	.....	.....	.....	.....	.....	.....	.....
Other States[b]	49	718	226	944	230,399	244	6	8.36	.....	.....	**6**	6.36	2	10
Total, 1914	**585**	**31,265**	**13,421**	**44,686**	**12,845,058**	**287**	**147**	**4.70**	**18**	**1.34**	**165**	**3.69**	**69**	**106**
Total, 1913	694	39,917	16,222	56,139	17,369,266	327	203	5.09	33	2.03	**236**	4.20	100	180
Total, 1912	814	37,539	14,237	51,776	15,831,250	306	185	4.93	54	3.79	**239**	4.62	87	159
Total, 1911	396	31,557	13,136	44,693	13,774,325	308	199	6.31	39	2.97	**238**	5.33	91	195

[a] Includes shaft accidents.
[b] Includes Colorado, Maryland, Oregon, South Dakota, Tennessee, and Wyoming.

TABLE 7.—*Number of men employed, number of days worked, and number of men killed per 1,000 employed in and about the* **gold** *and* **miscellaneous metal** *mines in the United States during the calendar year 1914.*

State.	Number of active operators	Number of employees.			Days' work done.	Average number of days worked.	Number killed.						Widows.	Orphans.
		Underground.	On the surface.	Total.			Underground.[a]	Per 1,000 employed.	On the surface.	Per 1,000 employed.	**Total.**	Per 1,000 employed.		
Alaska	327	5,886	1,496	7,382	1,891,650	256	13	2.21	4	2.67	**17**	2.30	**1**	3
Arizona	197	1,303	546	1,849	450,829	244	6	4.60	.....	.....	**6**	3.24	.....	.....
California	805	4,809	3,404	8,213	2,305,316	281	29	6.03	8	2.35	**37**	4.51	**11**	16
Colorado	394	7,370	1,647	9,017	2,705,100	300	41	5.56	4	2.43	**45**	4.99	**17**	15
Georgia	7	25	110	135	18,051	134	.....	.....	.....	.....	.....	.....	.....	.....
Idaho	459	3,463	1,153	4,616	1,211,566	262	20	5.78	2	1.73	**22**	4.77	**10**	10
Montana	250	1,948	650	2,598	637,723	245	4	2.05	2	3.08	**6**	2.31	**1**	**1** 1
Nevada	389	4,069	1,442	5,511	1,664,663	302	14	3.44	2	1.39	**16**	2.90	**4**	3
New Mexico	84	663	245	908	219,227	241	2	3.02	.....	.....	**2**	2.20	.....	.....
New York	3	141	20	161	48,582	302	.....	.....	.....	.....	.....	.....	.....	.....
North Carolina	11	230	183	413	99,164	240	3	13.04	.....	.....	**3**	7.26	**3**	8
Oregon	207	642	547	1,189	195,802	165	1	1.56	.....	.....	**1**	.84	.....	.....
South Dakota	52	1,394	358	1,752	565,998	323	3	2.15	1	2.79	**4**	2.28	**3**	6
Tennessee	6	317	102	419	105,177	251	3	9.46	.....	.....	**3**	7.16	.....	.....
Texas	3	220	60	280	86,450	309	.....	.....	.....	.....	.....	.....	.....	.....
Utah	163	1,873	402	2,275	652,060	287	14	7.47	1	2.49	**15**	6.59	**8**	21
Virginia	8	229	254	483	131,515	272	.....	.....	1	3.94	**1**	2.07	**1**	2
Washington	128	335	209	544	69,211	127	.....	.....	.....	.....	.....	.....	.....	.....
Wyoming	35	51	57	108	9,839	91	.....	.....	.....	.....	.....	.....	.....	.....
Other States[b]	8	464	121	585	173,357	296	1	2.16	.....	.....	**1**	1.71	**1**	2
Total, 1914	3,536	35,432	13,006	48,438	13,241,280	273	154	4.35	25	1.92	179	3.70	**60**	**87**
Total, 1913	4,739	44,810	14,691	59,501	16,133,608	276	180	4.02	30	2.04	**210**	3.53	67	70
Total, 1912	4,137	31,322	12,822	44,144	12,229,761	277	147	4.69	29	2.26	**176**	3.99	71	98
Total, 1911	3,817	35,176	13,743	48,919	13,512,633	276	163	4.63	30	2.18	**193**	3.95	61	118

[a] Includes shaft accidents.
[b] Includes Alabama, Arkansas, Maryland, New Jersey, and South Carolina.

TABLE 8.—*Number of men employed, number of days worked, and number of men killed per 1,000 employed in and about the* ***iron*** *mines in the United States during the calendar year 1914.*

State.	Number of active operators.	Number of employees.			Days' work done.	Average number of days worked.	Number killed.						Widows.	Orphans.
		Underground.	On the surface.	Total.			Underground.[a]	Per 1,000 employed.	On the surface.	Per 1,000 employed.	**Total.**	Per 1,000 employed.		
Alabama	15	3,002	2,134	5,136	1,413,258	275	23	7.66	2	0.94	**25**	4.87	15	29
Michigan	46	10,025	4,576	14,601	4,035,527	276	55	5.49	3	.66	**58**	3.97	35	69
Minnesota	57	7,886	9,808	17,694	4,399,549	249	26	3.30	17	1.73	**43**	2.43	22	52
Missouri	5	28	88	116	31,596	272	.....	.....	.....	.....	.....	.....	.....	.....
New Jersey	5	554	281	835	241,247	289	3	5.42	.....	.....	**3**	3.59	3	9
New York	13	1,237	620	1,857	519,629	280	7	5.66	.....	.....	**7**	3.77	4	3
Pennsylvania	7	50	258	308	78,831	256	.....	.....	.....	.....	.....	.....	.....	.....
Tennessee	7	331	489	820	181,170	221	2	6.04	2	4.09	**4**	4.88	2	6
Virginia	7	320	760	1,080	276,597	256	.....	.....	1	1.32	**1**	.93	.....	.....
Wisconsin	7	790	513	1,303	309,492	238	2	2.53	.....	.....	**2**	1.53	2	7
Other States[b]	27	624	433	1,057	259,082	245	2	3.21	3	6.93	**5**	4.73	3	3
Total, 1914	**196**	**24,847**	**19,960**	**44,807**	**11,745,978**	**262**	**120**	**4.83**	**28**	**1.40**	**148**	**3.30**	**86**	**178**
Total, 1913	206	29,384	21,749	51,133	15,064,429	295	122	4.15	43	1.98	**165**	3.23	81	178
Total, 1912	194	26,799	18,947	45,746	13,035,485	285	136	5.07	36	1.90	**172**	3.76	84	198
Total, 1911	207	25,461	20,492	45,953	12,749,121	277	136	5.34	61	2.98	**197**	4.29	114	237

[a] Includes shaft accidents.

[b] Includes Arizona, California, Connecticut, Georgia, Idaho, Kentucky, Maryland, Massachusetts, Montana, Nevada, New Mexico, North Carolina, Ohio, Utah, Washington, and Wyoming.

TABLE 9.—*Number of men employed, number of days worked, and number of men killed per 1,000 employed in and about the* ***lead*** *and* ***zinc*** *mines (Mississippi Valley) in the United States during the calendar year 1914.*

State.	Number of active operators.	Number of employees.			Days' work done.	Average number of days worked.	Number killed.						Widows.	Orphans.
		Underground.	On the surface.	Total.			Underground.[a]	Per 1,000 employed.	On the surface.	Per 1,000 employed.	**Total.**	Per 1,000 employed.		
Illinois	8	292	198	490	104,462	213	.....	.....	.....	.....	.....	.....	.....	.....
Kansas	21	184	85	269	60,743	226	1	5.43	.....	.....	**1**	3.72	**1**	1
Missouri	160	5,851	2,437	8,288	2,133,910	257	22	3.76	3	1.23	**25**	3.02	16	47
Oklahoma	17	353	159	512	129,398	253	3	8.50	.....	.....	**3**	5.86	3	2
Wisconsin	30	868	401	1,269	332,878	262	9	10.37	.....	.....	**9**	7.09	**1**	.....
Other States[b]	12	61	46	107	17,718	166	2	32.79	.....	.....	**2**	18.69	2	3
Total, 1914	**248**	**7,609**	**3,326**	**10,935**	**2,779,109**	**254**	**37**	**4.86**	**3**	**.90**	**40**	**3.66**	**23**	**53**
Total, 1913	409	9,261	3,436	12,697	3,226,669	254	32	3.46	10	2.91	**42**	3.31	25	46
Total, 1912	464	10,812	3,520	14,332	3,782,944	265	48	4.44	6	1.70	**54**	3.77	26	62
Total, 1911	483	9,247	3,274	12,521	3,202,339	256	32	3.46	11	3.36	**43**	3.43	26	40

[a] Includes shaft accidents.

[b] Includes Arkansas and Kentucky.

TABLE 10.—*Number of men employed, number of days worked, and number of men killed per 1,000 employed in and about the* ***miscellaneous mineral*** *mines in the United States during the calendar year 1914.*

State.	Number of active operators.	Number of employees.			Days' work done.	Average number of days worked.	Number killed.						Widows.	Orphans.
		Underground.	On the surface.	Total.			Underground.[a]	Per 1,000 employed.	On the surface.	Per 1,000 employed.	**Total.**	Per 1,000 employed.		
California	12	151	170	321	99,260	309	.....	.....	1	5.88	**1**	3.12	.....	.....
Florida	18	.....	2,885	2,885	679,182	235	.....	.....	10	3.47	**10**	3.47	4	1
Georgia	10	41	89	130	25,535	196	.....	.....	1	11.24	**1**	7.69	.....	.....
Iowa	6	254	14	268	60,855	227	.....	.....	.....	.....	.....	.....	.....	.....
Maine	4	.....	128	128	30,389	237	.....	.....	.....	.....	.....	.....	.....	.....
Michigan	5	221	61	282	76,169	270	1	4.52	.....	.....	**1**	3.55	1	1
New York	18	816	168	984	265,615	270	4	4.90	.....	.....	**4**	4.07	3	5
North Carolina	18	137	248	385	59,049	153	3	21.90	1	4.03	**4**	10.39	2	8
Ohio	3	155	17	172	45,604	265	.....	.....	.....	.....	.....	.....	.....	.....
Pennsylvania	15	30	87	117	25,722	220	.....	.....	.....	.....	.....	.....	.....	.....
Tennessee	12	167	1,169	1,336	295,603	221	.....	.....	5	4.28	**5**	3.74	3	3
Utah	10	57	69	126	30,906	245	.....	.....	.....	.....	.....	.....	.....	.....
Vermont	5	76	36	112	29,698	265	.....	.....	.....	.....	.....	.....	.....	.....
Virginia	10	89	225	314	90,302	288	.....	.....	.....	.....	.....	.....	.....	.....
Other States[b]	94	271	1,418	1,689	363,417	215	.....	.....	1	.71	**1**	.59	1	.....
Total, 1914	**240**	**2,465**	**6,784**	**9,249**	**2,177,306**	**235**	**8**	**3.25**	**19**	**2.80**	**27**	**2.92**	**14**	**18**
Total, 1913	329	2,997	8,809	11,806	2,983,883	253	11	3.67	19	2.16	**30**	2.54	13	27
Total, 1912	358	3,584	9,617	13,201	3,619,070	274	6	1.67	14	1.46	**20**	1.52	5	3
Total, 1911	329	3,182	10,711	13,893	3,588,155	258	12	3.77	12	1.12	**24**	1.73	5	10

[a] Includes shaft accidents.
[b] Includes Alabama, Arizona, Arkansas, Colorado, Connecticut, Idaho, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Missouri, Montana, Nevada, New Hampshire, New Jersey, New Mexico, Oklahoma, Oregon, South Carolina, South Dakota, Texas, Washington, Wisconsin, and Wyoming.

TABLE 11.—*Number of men* ***seriously injured*** *in and about all* ***metal*** *and* ***mis*** *the calendar year*

State.	Underground.									
	Fall of rock or ore from roof or wall.	Rock or ore while loading at working face.	Timber or hand tools.	Explosives.	Haulage accidents.	Falling down chute, winze, raise, or stope.	Run of ore from chute or pocket.	Drilling accidents.	Electricity.	Machinery (not including locomotives or drills).
	1	2	3	4	5	6	7	8	9	10
Alabama	29	27	14	3	69	4	.....	13	.....	2
Alaska [a]	5	.....	3	6	3	3	.....	3	.....	.....
Arizona	253	55	85	14	117	26	9	24	1	5
Arkansas	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
California	73	30	14	5	31	12	.....	14	.....	2
Colorado	38	4	7	7	15	6	3	5	.....	1
Connecticut	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Florida	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Georgia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Idaho	36	9	15	8	7	4	1	5	.....	4
Illinois	1	1	.....	.....	.....	.....	.....	.....	.....	.....
Indiana, Louisiana, and West Virginia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Iowa	.....	4	1	.....	2	.....	.....	2	.....	.....
Kansas	2	.....	.....	.....	1	.....	.....	.....	.....	.....
Kentucky	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maine	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maryland	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Massachusetts	1	.....	1	.....	.....	.....	.....	.....	.....	.....
Michigan	284	201	90	27	180	32	29	54	2	10
Minnesota	114	18	115	22	91	24	25	3	.....	2
Missouri	25	1	2	5	9	1	.....	2	.....	3
Montana	76	24	29	3	35	35	14	5	.....	1
Nevada	49	8	15	8	28	15	1	13	.....	6
New Hampshire	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
New Jersey	13	2	2	2	3	3	4	4	.....	.....
New Mexico	1	.....	3	.....	3	1	.....	.....	.....	.....
New York	13	22	5	1	22	1	4	9	1	.....
North Carolina	1	8	.....	2	5	.....	.....	4	.....	1
Ohio	.....	1	1	2	.....	.....	.....	.....	1	1
Oklahoma	3	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oregon	2	.....	.....	.....	.....	.....	.....	.....	.....	2
Pennsylvania	.....	.....	.....	.....	1	.....	.....	.....	.....	1
South Carolina	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Dakota	20	2	2	2	8	4	1	6	.....	1
Tennessee	7	17	1	5	9	3	.....	5	.....	2
Texas	.....	.....	.....	.....	1	.....	.....	.....	.....	.....
Utah	37	5	11	2	12	9	.....	3	.....	.....
Vermont	2	.....	.....	.....	1	.....	.....	.....	.....	.....
Virginia	.....	.....	.....	2	.....	.....	.....	.....	.....	.....
Washington	2	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wisconsin	31	3	5	4	16	7	2	1	.....	1
Wyoming	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total, 1914	**1,118**	**442**	**421**	**130**	**669**	**191**	**93**	**175**	**5**	**45**
Total, 1913	1,260	320	571	132	818	226	145	219	7	86
Total, 1912	1,102	261	313	153	579	201	113	203	7	51
Total, 1911	1,214	.....	267	139	606	161	105	190	3	106

[a] Placer mines not included.

cellaneous mineral *mines (except coal mines) in the United States (by States) during 1914, by causes.*

Underground—Continued.						Shaft.						
Mine fires.	Suffocation from natural gases.	Inrush of water.	Stepping on nail.	Other causes.	**Total, underground.**	Falling down shafts.	Objects falling down shafts.	Breaking of cables.	Overwinding.	Skip or cage.	Other causes.	**Total, shaft.**
11	12	13	14	15		16	17	18	19	20	21	
				21	182							
				9	32	2						2
			3	73	665	4	2	1		13	13	33
				29	210					9	4	13
4				10	100		1	1		2		4
				9	98	1	3			3	2	9
					2					1		1
					9							
					3							
				1	1							
					2							
	1		3	174	1,087	9	9		1	23	13	55
	2		4	45	465	2	2			8	7	19
				9	57	1	1			2		4
				34	256	1	5			9	2	17
			1	6	150					1	5	6
					1							
				2	35							
			1		2	1				2		3
				8	86		1			1	1	3
					21		1					1
					6							
					3							
				2	6							
					2							
				5	51							
				3	52			1				1
					1							
				7	86					1		1
					3							
				1	3							
					2	1						1
				10	80	3	5			1	3	12
4	**3**		**12**	**458**	**3,766**	**25**	**30**	**3**	**1**	**76**	**50**	**185**
6	3	9	18	425	4,245	40	48	1	3	80	51	223
1	5	3	9	269	3,270	35	50	3		71	18	177
	1			318	3,110	42	40	2	12		57	153

TABLE 11.—*Number of men* ***seriously injured*** *in and about all* ***metal*** *and* ***miscel*** *the calendar year*

State.	Surface (shops and yards).									
	Mine cars, mine locomotives, or aerial trams.	Railway cars and locomotives.	Run or fall of ore in or from ore bins.	Falls of persons.	Stepping on nail.	Hand tools, axes, bars, etc.	Electricity.	Machinery.	Other causes.	Total, surface.
	22	23	24	25	26	27	28	29	30	
Alabama				1		1		1	3	6
Alaska [a]		1		4				1	1	7
Arizona	15	1	3	5	2	10	1	13	35	85
Arkansas										
California	7	1	4	3		8		18	7	48
Colorado	3			3		2	1		1	10
Connecticut				1		1				2
Florida				1						1
Georgia										
Idaho		1		1		2		1	1	6
Illinois	1								1	2
Indiana, Louisiana, and West Virginia			1	1				1	6	9
Iowa										
Kansas				1						1
Kentucky										
Maine										
Maryland										
Massachusetts										
Michigan	13	4	7	34	4	35		19	52	168
Minnesota	13	2	3	38	1	16		20	31	124
Missouri	1	1		1	1	3		6	6	19
Montana	3			4		2	1	10	9	29
Nevada	2			1		4		5	9	21
New Hampshire										
New Jersey		2				1			1	4
New Mexico				1		1		1	3	6
New York	1	1						1	1	4
North Carolina	1					1		2	1	5
Ohio										
Oklahoma				1						1
Oregon				1				1	1	3
Pennsylvania										
South Carolina				1						1
South Dakota	1					1		1	1	4
Tennessee	2	1		1		1		1	1	7
Texas										
Utah	1							2	2	5
Vermont			1	1				1		3
Virginia	1	3						2	5	11
Washington									1	1
Wisconsin	1		2	6		3			2	14
Wyoming										
Total, 1914	**56**	**18**	**21**	**111**	**8**	**92**	**3**	**107**	**181**	**607**
Total, 1913	38	32	5	91	6	83	6	107	199	567
Total, 1912	32	27	19	87	6	63	4	104	123	465
Total, 1911	50	15	16				1	92	182	356

[a] Placer mines not included.

laneous mineral *mines (except coal mines) in the United States (by States) during 1914, by causes*—Continued.

Open pit.												Grand total.			
Falls or slides of rock or ore.	Explosives.	Haulage accidents (locomotives, etc.).	Steam shovels.	Falls of persons.	Falls of derricks, booms, etc.	Run or fall of ore in or from ore bins.	Machinery (other than locomotives or steam shovels).	Electricity.	Hand tools.	Other causes.	Total, open pit.				
31	32	33	34	35	36	37	38	39	40	41		1914	1913	1912	1911
.....	.....	8	1	.....	.....	.....	1	.....	1	3	14	202	268	287	153
.....	1	.....	.....	2	.....	.....	.....	.....	1	8	12	53	4	25	.....
.....	2	1	.....	.....	.....	.....	.....	.....	.....	.....	3	786	807	549	336
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	3	2
.....	2	.....	.....	7	.....	.....	19	.....	7	7	42	313	206	167	123
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	114	95	137	128
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	1	.....	1
2	.....	3	.....	1	3	.....	3	.....	.....	6	18	19	55	39	34
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	9
.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	1	114	82	61	43
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	5	15	7
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9	14	29	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9	3	.....	4
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	2	3	9
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	1	.....	.....	5
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	.....	3
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	2	.....	.....
.....	1	.....	1	1	.....	.....	.....	.....	.....	.....	3	1,313	1,338	1,213	1,268
49	16	34	24	23	3	.....	3	.....	24	81	257	865	1,572	857	1,131
.....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	2	82	57	102	140
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	303	449	224	138
.....	3	1	.....	5	.....	.....	4	.....	2	6	21	198	184	162	75
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	.....	.....
.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	40	42	55	29
3	3	12	2	.....	.....	.....	2	.....	2	4	28	46	35	13	30
3	.....	1	1	.....	1	.....	.....	.....	.....	1	7	100	123	70	83
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	28	17	13	11
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	3	5	9
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	6	2	2
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9	6	5	4
1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	2	4	2	6	.....
.....	.....	2	.....	.....	.....	.....	2	.....	.....	1	5	6	.....	10	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	55	23	25	39
9	.....	3	.....	1	.....	.....	2	.....	7	2	24	84	45	75	52
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	.....	.....
19	9	12	3	2	1	.....	4	2	.....	16	68	160	206	237	204
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	2	6	.....
.....	.....	.....	.....	.....	.....	.....	2	.....	.....	2	4	18	19	21	33
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	16	3	6
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	106	191	82	58
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	1	.....
88	38	78	32	43	8	.....	44	2	44	138	515	5,073	.....	.....	.....
161	49	126	112	84	11	5	31	3	94	179	855	.....	5,890	.....	.....
124	54	77	70	46	13	1	25	6	45	129	590	.....	.....	4,502	.....
94	41	123	64	50	10	4	46	3	.....	115	550	.....	.....	.....	4,169

TABLE 12.—*Number of men* ***slightly injured*** *in and about all* ***metal*** *and* ***miscella***
calendar year 1914,

State.	Underground.									
	Fall of rock or ore from roof or wall.	Rock or ore while loading at working face.	Timber or hand tools.	Explosives.	Haulage accidents.	Falling down chute, winze, raise, or stope.	Run of ore from chute or pocket.	Drilling accidents.	Electricity.	Machinery (not including locomotives or drills).
	1	2	3	4	5	6	7	8	9	10
Alabama	129	322	89	7	361	15	.....	90	.....	8
Alaska [a]	17	9	6	8	21	3	1	7	.....	3
Arizona	1,339	373	581	32	466	97	62	256	11	21
Arkansas	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
California	216	176	165	8	86	41	21	107	3	10
Colorado	156	44	61	1	120	26	44	72	1	6
Connecticut	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Florida	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Georgia	.....	.....	2	.....	2	.....	.....	1	.....	.....
Idaho	140	47	79	4	34	24	2	44	.....	10
Illinois	3	15	2	.....	4	2	1	5	.....	1
Indiana, Louisiana, and West Virginia.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Iowa	2	11	2	.....	3	1	.....	3	.....	.....
Kansas	12	1	.....	.....	.....	.....	.....	.....	.....	.....
Kentucky	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maine	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maryland	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Massachusetts	.....	.....	.....	1	.....	.....	.....	.....	.....	.....
Michigan	1,065	988	410	42	532	109	132	249	17	28
Minnesota	479	67	350	16	178	13	38	39	1	7
Missouri	172	188	62	29	136	8	3	66	1	12
Montana	567	225	190	13	237	160	151	59	4	8
Nevada	157	46	62	6	75	34	3	50	.....	3
New Hampshire	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Jersey	67	61	31	.....	35	23	14	45	.....	5
New Mexico	17	19	1	.....	1	1	.....	3	.....	1
New York	25	126	23	4	58	1	12	38	4	7
North Carolina	8	22	12	1	11	2	.....	15	.....	1
Ohio	3	9	4	2	2	1	.....	2	.....	3
Oklahoma	30	5	3	1	4	2	.....	8	.....	1
Oregon	5	.....	3	.....	2	.....	1	2	.....	.....
Pennsylvania	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Carolina	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Dakota	101	80	41	4	74	9	32	32	.....	5
Tennessee	38	187	24	11	71	9	5	63	.....	7
Texas	6	2	.....	.....	3	.....	.....	4	.....	.....
Utah	139	38	61	4	59	43	13	34	2	5
Vermont	2	.....	1	.....	.....	1	.....	.....	.....	.....
Virginia	20	17	2	.....	6	.....	.....	3	.....	.....
Washington	2	3	.....	.....	1	1	1	2	.....	1
Wisconsin	68	30	12	10	52	6	20	14	3	6
Wyoming	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total, 1914	**4,986**	**3,111**	**2,309**	**204**	**2,634**	**632**	**556**	**1,313**	**47**	**159**
Total, 1913	5,454	2,264	3,224	244	3,016	721	973	1,281	53	400
Total, 1912	5,882	2,873	2,543	246	2,732	740	928	1,410	32	420
Total, 1911	6,042	.....	1,796	242	2,924	747	876	1,207	30	576

[a] Placer mines not included.

neous mineral *mines (except coal mines) in the United States (by States) during the by causes.*

Underground—Continued.						Shaft.						
Mine fires.	Suffocation from natural gases.	Inrush of water.	Stepping on nail.	Other causes.	Total, underground.	Falling down shafts.	Objects falling down shafts.	Breaking of cables.	Overwinding.	Skip or cage.	Other causes.	Total, shaft.
11	12	13	14	15		16	17	18	19	20	21	
.....	.....	.....	9	125	1,155	1	.....	.....	.....	.....	.....	1
.....	.....	.....	.....	24	99	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	66	892	4,196	2	13	.....	.....	18	18	51
.....	4	.....	13	222	1,072	1	4	.....	.....	13	11	29
1	6	.....	6	114	658	.....	6	1	1	3	5	16
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	5	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	7	69	460	1	7	.....	.....	3	6	17
.....	.....	.....	.....	1	34	.....	.....	.....	.....	2	.....	2
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	1	.....	23	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	2	15	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	1	2	.....	.....	.....	.....	.....	.....	.....
.....	2	12	48	694	4,358	6	40	.....	1	53	50	150
.....	1	.....	27	187	1,403	.....	5	.....	.....	16	20	41
.....	.....	.....	4	330	1,011	2	20	.....	.....	27	26	75
1	.....	.....	20	240	1,875	3	30	.....	.....	24	2	59
.....	1	.....	2	42	481	.....	1	4	.....	2	2	9
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	3	21	305	1	6	1	.....	.....	1	9
.....	.....	.....	2	.....	45	.....	1	.....	.....	1	.....	2
.....	2	.....	.....	56	356	.....	6	.....	.....	6	.....	12
.....	.....	.....	.....	6	78	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	1	27	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	1	14	69	.....	1	.....	.....	4	1	6
.....	.....	.....	.....	6	19	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	1	102	481	.....	1	.....	.....	1	1	3
.....	.....	.....	2	44	461	1	7	.....	.....	1	1	10
.....	.....	.....	.....	2	17	.....	.....	.....	.....	.....	.....	.....
.....	3	.....	5	42	448	5	1	.....	.....	4	.....	10
.....	.....	.....	.....	.....	4	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	24	72	.....	.....	.....	.....	1	.....	1
.....	.....	.....	1	.....	12	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	4	64	289	2	3	.....	.....	5	2	12
.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....
2	19	12	222	3,325	19,531	25	152	6	2	184	146	515
6	18	8	300	2,585	20,547	60	201	8	5	139	97	510
11	30	7	232	2,723	20,809	69	228	3	5	174	125	604
24	17	14	.....	3,147	17,642	51	216	5	14	.....	187	473

TABLE 12.—*Number of men* ***slightly injured*** *in and about all* ***metal*** *and* ***miscel*** *calendar year 1914,*

State.	Surface (shops and yards).									
	Mine cars, mine locomotives, or aerial trams.	Railway cars and locomotives.	Run or fall of ore in or from ore bins.	Falls of persons.	Stepping on nail.	Hand tools, axes, bars, etc.	Electricity.	Machinery.	Other causes.	Total, surface.
	22	23	24	25	26	27	28	29	30	
Alabama	4	2	3	6	1	14	1	7	25	63
Alaska [a]	9	3	3	6	5	21	.....	1	7	55
Arizona	42	1	6	22	8	31	4	27	186	327
Arkansas	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
California	7	22	1	22	1	22	1	7	84	167
Colorado	3	1	4	10	5	5	2	5	49	84
Connecticut	.....	.....	.....	.....	.....	.....	.....	.....	2	2
Florida	6	4	.....	2	2	7	1	5	11	38
Georgia	1	.....	.....	.....	.....	4	.....	1	.....	5
Idaho	2	.....	.....	4	1	12	.....	6	9	34
Illinois	.....	2	1	.....	.....	7	1	1	5	17
Indiana, Louisiana, and West Virginia.	2	.....	4	15	11	10	.....	6	61	109
Iowa	.....	.....	1	.....	1	1	.....	2	2	7
Kansas	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kentucky	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maine	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maryland	.....	.....	1	.....	.....	1	.....	.....	.....	2
Massachusetts	.....	.....	.....	.....	.....	.....	.....	.....	2	2
Michigan	30	18	21	74	29	98	5	47	165	487
Minnesota	15	6	3	64	19	89	1	42	164	403
Missouri	10	5	4	10	12	19	.....	8	117	185
Montana	18	.....	8	6	2	32	1	18	65	150
Nevada	7	1	3	3	2	6	1	8	15	46
New Hampshire	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Jersey	.....	2	.....	6	1	4	1	2	11	27
New Mexico	1	.....	.....	.....	11	3	.....	.....	16	31
New York	.....	.....	.....	1	1	2	2	1	1	8
North Carolina	3	.....	.....	.....	.....	.....	.....	2	2	7
Ohio	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oklahoma	.....	.....	1	1	.....	1	.....	1	1	5
Oregon	.....	.....	.....	1	.....	.....	.....	6	5	12
Pennsylvania	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Carolina	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Dakota	8	.....	.....	4	3	5	.....	3	5	28
Tennessee	6	4	.....	4	5	7	.....	4	12	42
Texas	.....	.....	.....	.....	.....	.....	.....	.....	1	1
Utah	7	.....	3	3	9	16	.....	7	7	52
Vermont	.....	1	.....	.....	.....	.....	.....	.....	.....	1
Virginia	8	3	4	.....	2	2	.....	1	6	26
Washington	.....	.....	.....	1	.....	1	.....	.....	2	4
Wisconsin	2	.....	3	11	6	13	2	8	35	80
Wyoming	.....	.....	.....	.....	.....	1	.....	.....	.....	1
Total, 1914	**191**	**75**	**74**	**276**	**137**	**434**	**23**	**226**	**1,073**	**2,509**
Total, 1913	128	97	49	285	121	597	16	311	779	2,383
Total, 1912	138	52	101	306	117	499	25	369	603	2,210
Total, 1911	135	42	100	.....	.....	.....	22	289	1,048	1,636

[a] Placer mines not included.

laneous mineral *mines (except coal mines) in the United States (by States) during the by causes*—Continued.

Open pit.												Grand total.			
Falls or slides of rock or ore.	Explosives.	Haulage accidents (locomotives, etc.).	Steam shovels.	Falls of persons.	Falls of derricks, booms, etc.	Run or fall of ore in or from ore bins.	Machinery (other than locomotives or steam shovels).	Electricity.	Hand tools.	Other causes.	Total, open pit.				
31	32	33	34	35	36	37	38	39	40	41		1914	1913	1912	1911
.....	.....	17	4	6	.....	.....	3	.....	5	6	41	1,260	1,628	1,761	1,284
4	1	.....	.....	.....	.....	.....	1	1	8	38	53	207	25	64	.....
5	1	1	.....	1	.....	.....	.....	.....	.....	6	14	4,588	4,269	3,670	2,314
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9	10	9
29	.....	.....	.....	20	.....	2	74	2	45	47	219	1,487	636	698	401
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	758	159	688	610
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	3	3	.....	1
7	6	4	1	10	1	1	17	.....	21	66	134	172	206	192	124
4	.....	2	.....	.....	.....	.....	.....	.....	3	.....	9	20	16	29	13
3	.....	.....	.....	.....	.....	.....	3	.....	2	2	10	521	667	659	575
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	53	13	24	20
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	109	141	219	1
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	30	43	17	18
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	15	31	27	69
.....	.....	1	.....	1	.....	.....	.....	.....	.....	2	4	4	14	9	13
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	3	2	1	7
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	1	1	.....
1	.....	.....	.....	1	.....	.....	.....	.....	1	.....	3	4,998	5,183	6,851	6,084
89	16	66	68	70	5	.....	10	.....	109	282	715	2,562	4,788	3,567	5,059
1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	2	1,273	1,053	1,586	1,100
1	.....	.....	.....	.....	.....	.....	.....	.....	50	.....	51	2,135	2,487	1,998	1,075
10	9	1	4	9	.....	.....	14	.....	9	26	82	618	909	662	298
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	5	1
6	1	2	.....	1	.....	1	.....	.....	1	1	13	354	307	520	389
14	1	56	16	15	.....	.....	9	.....	11	35	157	235	260	154	63
5	1	5	1	.....	.....	.....	.....	1	1	.....	14	390	369	330	274
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	85	21	50	21
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	27	28	20	32
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	81	123	48	5
1	.....	.....	.....	1	.....	.....	.....	.....	.....	1	3	34	22	25	15
1	1	.....	.....	.....	.....	.....	1	.....	.....	3	6	6	6	2	5
.....	.....	3	.....	.....	.....	.....	2	.....	2	.....	7	7	16	26	1
.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	2	514	468	151	665
19	.....	13	.....	4	.....	1	3	.....	9	12	61	574	326	315	226
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	19	13	3	.....
250	55	80	27	115	.....	.....	27	2	68	344	968	1,478	1,649	1,184	1,245
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	6	6	1
1	.....	.....	.....	.....	.....	.....	.....	.....	1	13	15	114	108	100	94
.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	1	17	25	20	14
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	381	1,045	537	278
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	4	3	4
453	**92**	**251**	**121**	**255**	**6**	**8**	**164**	**6**	**346**	**888**	**2,588**	**25,143**	.....	.....	.....
681	164	344	239	337	29	25	156	14	451	1,201	3,641	.....	27,081	.....	.....
433	120	301	238	285	35	8	147	7	330	705	2,609	.....	.....	26,232	.....
426	109	377	180	297	69	9	301	9	.....	880	2,657	.....	.....	.....	22,408

TABLE 13.—*Number of men seriously and slightly injured per 1,000 employed in and United States (by States)*

State.	Employees.	Number seriously injured.					
		Underground.[a]	Per 1,000 employed.	On the surface.	Per 1,000 employed.	Total.	Per 1,000 employed.
Alabama	5,225	182	60.30	20	9.06	202	38.66
Alaska	8,000	34	5.46	19	10.70	53	6.63
Arizona	14,011	698	65.23	88	26.58	786	56.10
Arkansas and Louisiana	472	.....	.....	9	19.69	9	19.07
California	9,761	223	38.53	90	22.65	313	32.07
Colorado	9,228	104	13.88	10	5.76	114	12.35
Connecticut	216	.....	.....	2	21.98	2	9.26
Florida	2,885	.....	.....	19	6.59	19	6.59
Georgia	305	.....	.....	.....	.....	.....	.....
Idaho	5,249	107	26.89	7	5.51	114	21.72
Illinois	490	3	10.27	2	10.10	5	10.20
Iowa	281	9	35.43	.....	.....	9	32.03
Kansas	315	3	14.29	1	9.52	4	12.70
Kentucky	221	.....	.....	1	6.10	1	4.52
Maine	128	.....	.....	.....	.....	.....	.....
Maryland	69	1	62.50	.....	.....	1	14.49
Massachusetts	31	2	90.91	.....	.....	2	64.52
Michigan	27,272	1,142	60.06	171	20.70	1,313	48.14
Minnesota	17,694	484	61.37	381	38.85	865	48.89
Missouri	8,480	61	10.31	21	8.19	82	9.67
Montana	13,046	273	26.44	30	11.03	303	23.23
Nevada	6,821	156	33.40	42	19.53	198	29.03
New Hampshire	38	1	58.82	.....	.....	1	26.32
New Jersey	1,362	35	35.39	5	13.40	40	29.37
New Mexico	2,424	12	11.89	34	24.03	46	18.98
New York	3,002	89	40.57	11	13.61	100	33.31
North Carolina	994	22	42.55	6	12.58	28	28.17
Ohio	192	6	34.68	.....	.....	6	31.25
Oklahoma	596	3	8.09	1	4.44	4	6.71
Oregon	1,279	6	8.36	3	5.35	9	7.04
Pennsylvania	425	2	25.00	2	5.80	4	9.41
South Carolina	416	.....	.....	6	14.67	6	14.42
South Dakota	1,841	51	35.27	4	10.13	55	29.88
Tennessee	3,253	53	39.06	31	16.35	84	25.82
Texas	346	1	4.22	.....	.....	1	2.89
Utah	5,837	87	26.75	73	28.24	160	27.41
Vermont	112	3	39.47	3	83.33	6	53.57
Virginia	1,877	3	4.70	15	12.11	18	9.59
Washington	865	3	5.35	1	3.29	4	4.62
Wisconsin	2,576	92	55.49	14	15.25	106	41.15
Wyoming	480	.....	.....	.....	.....	.....	.....
Total 1914	**158,115**	**3,951**	**38.88**	**1,122**	**19.86**	**5,073**	**32.08**
Total, 1913	191,276	4,468	35.36	1,422	21.91	5,890	30.79
Total, 1912	169,199	3,447	31.32	1,055	17.84	4,502	26.61
Total, 1911	165,979	3,263	31.19	906	14.77	4,169	25.12

[a] Includes shaft accidents.

about all ***metal*** *and* ***miscellaneous mineral*** *mines (except coal mines) in the during the calendar year 1914.*

Number slightly injured.						Character of accidents that must be reported according to State law.
Underground[a]	Per 1,000 employed.	On the surface.	Per 1,000 employed.	Total.	Per 1,000 employed.	
1,156	383.04	104	47.12	**1,260**	241.15	
99	15.90	108	60.85	**207**	25.88	Fatal or serious, at mines employing 6 or more men. Acts Apr. 30, 1913; Apr. 25, 1915.
4,247	396.92	341	102.99	**4,588**	327.46	Fatal or serious. Acts of 1912, chap. 33.
.....	.....	109	238.51	**109**	230.93	
1,101	190.25	386	97.13	**1,487**	152.34	Fatal and more than one week. Act Apr. 8, 1911.
674	89.95	84	48.41	**758**	82.14	All fatal or otherwise, by all employers of 4 or more persons. Act Apr. 10, 1915.
.....	.....	3	32.97	**3**	13.89	
.....	.....	172	59.62	**172**	59.62	
5	75.76	15	62.76	**20**	65.57	
477	119.88	44	34.65	**521**	99.26	Fatal or serious. Rev. Code, 1909, sec. 207.
36	123.29	17	85.86	**53**	108.16	Fatal or one week. Act June 28, 1913.
23	90.55	7	259.26	**30**	106.76	
15	71.43	.....	.....	**15**	47.62	
.....	.....	4	24.39	**4**	18.10	
.....	.....	.....	.....	.....	.....	
.....	.....	3	56.60	**3**	43.48	All accidents. Act Apr. 16, 1914.
2	90.91	2	222.22	**4**	129.03	
4,508	237.10	490	59.33	**4,998**	183.26	All fatal or otherwise. Act Apr. 25, 1911.
1,444	183.11	1,118	113.99	**2,562**	144.79	Fatal or serious. Gen. Stats., 1913, par. 3924.
1,086	183.60	187	72.90	**1,273**	150.12	Fatal or serious. Rev. Stats., 1909, sec. 8462.
1,934	187.29	201	73.90	**2,135**	163.65	Fatal or serious at mines employing 5 or more men. Code 1907, secs. 1717 and 1720.
490	104.90	128	59.53	**618**	90.60	Fatal or serious at mines employing wage earners. Laws of 1912.
.....	.....	.....	.....	.....	.....	
314	317.49	40	107.24	**354**	259.91	All accidents. Laws of 1911, chap. 95.
47	46.58	188	132.86	**235**	96.95	
368	167.73	22	27.23	**390**	129.91	All fatal or otherwise. Act Mar. 16, 1914.
78	150.87	7	14.68	**85**	85.51	
27	156.07	.....	.....	**27**	140.63	
75	202.16	6	26.67	**81**	135.91	
19	26.46	15	26.74	**34**	26.58	Fatal and all injuries causing employee to cease work, by employers of 4 or more persons. Act Feb. 18, 1911.
.....	.....	6	17.39	**6**	14.12	All accidents. Act June 2, 1915, effective January 1, 1916.
.....	.....	7	17.11	**7**	16.83	
484	334.72	30	75.95	**514**	279.20	Fatal or serious at all mines not worked exclusively by owner or lessee. Acts Mar. 1, 1890; Mar. 4, 1915.
471	347.09	103	54.32	**574**	176.45	
17	71.73	2	18.35	**19**	54.91	
458	140.84	1,020	394.58	**1,478**	253.21	
4	52.63	1	27.78	**5**	44.64	
73	114.42	41	33.09	**114**	60.74	
12	21.39	5	16.45	**17**	19.65	"Any accident." Acts Mar. 14, 1911; Mar. 22, 1915.
301	181.54	80	87.15	**381**	147.90	All "causing death or disability," by employers of 4 or more persons. Act May 3, 1911.
1	4.03	1	4.31	**2**	4.17	
20,046	**197.27**	**5,097**	**90.22**	**25,143**	**159.02**	
21,057	166.63	6,024	92.81	**27,081**	141.58	
21,413	194.56	4,819	81.48	**26,232**	155.04	
18,115	173.15	4,293	69.97	**22,408**	135.01	

TABLE 14.—*Number of mine operators reporting less than 1,000 days' work performed, and number of those reporting 1,000 or more days' work performed during the calendar year 1914.*

State.	Less than 1,000 days' work done.						1,000 or more days' work done.						Grand total.		
	Copper.	Iron.	Lead and zinc.	Gold and miscellaneous metal.	Nonmetal.	Total.	Copper.	Iron.	Lead and zinc.	Gold and miscellaneous metal.	Nonmetal.	Total.	1914	1913	1912
Alabama	....	....	....	....	....	....	....	15	....	2	4	21	21	24	20
Alaska	10	....	....	100	....	110	13	....	....	227	....	240	350	350	[a]30
Arizona	82	1	....	144	3	230	60	....	....	53	3	116	346	426	479
Arkansas, Louisiana, Rhode Island, and West Virginia	....	....	5	....	....	5	....	....	....	....	2	2	7	11	13
California	23	1	....	570	6	600	13	....	....	235	6	254	854	1,054	1,048
Colorado	5	1	....	206	4	216	3	3	....	188	2	196	412	1,013	624
Connecticut	....	....	....	....	....	....	....	1	....	....	5	6	6	5	5
Florida	....	....	....	....	....	....	....	....	....	....	18	18	18	27	24
Georgia	....	....	....	3	3	6	....	1	....	4	7	12	18	21	29
Idaho	46	....	....	372	3	421	14	1	....	87	3	105	526	588	639
Illinois	....	....	1	....	....	1	....	....	7	....	....	7	8	12	8
Iowa	....	....	....	....	1	1	....	1	....	....	5	6	7	9	12
Kansas	....	....	9	....	....	9	....	....	12	....	3	15	24	40	50
Kentucky	....	....	2	....	1	3	....	1	5	....	2	8	11	15	14
Maine	....	....	....	....	1	1	....	....	....	....	3	3	4	5	4
Maryland	....	1	....	1	6	8	1	....	....	1	2	4	12	16	19
Massachusetts	....	....	....	....	2	2	....	1	....	....	....	1	3	3	4
Michigan	....	1	....	....	....	1	29	45	....	....	5	79	80	84	79
Minnesota	....	1	....	....	....	1	....	56	....	....	....	56	57	54	43
Missouri	....	1	39	....	4	44	....	4	121	....	3	128	172	283	318
Montana	35	1	....	178	1	215	14	....	....	72	1	87	302	384	405
Nevada	33	1	....	249	4	287	21	1	....	140	1	163	450	566	554
New Hampshire	....	....	....	....	2	2	....	....	....	....	3	3	5	7	7
New Jersey	....	....	....	....	....	....	....	5	....	1	1	7	7	7	10
New Mexico	16	1	....	61	2	80	12	3	....	23	....	38	118	139	163
New York	....	1	....	1	3	5	....	12	....	2	15	29	34	36	39
North Carolina	....	....	....	3	8	11	....	1	....	8	10	19	30	60	70
Ohio	....	....	....	....	....	....	....	1	....	....	3	4	4	7	7
Oklahoma	....	....	2	....	....	2	....	....	15	....	6	21	23	36	30
Oregon	16	....	....	176	1	193	....	....	....	31	1	32	225	261	260
Pennsylvania	....	....	....	....	8	8	....	7	....	....	7	14	22	34	38
South Carolina	....	....	....	3	....	3	....	....	....	....	2	2	5	6	7
South Dakota	4	....	....	38	2	44	1	....	....	14	1	16	60	74	63
Tennessee	....	....	....	....	....	....	2	7	....	6	12	27	27	36	36
Texas	....	....	....	....	....	....	....	....	....	3	4	7	7	8	8
Utah	37	2	....	109	3	151	21	1	....	54	7	83	234	285	336
Vermont	....	....	....	....	1	1	....	....	....	....	4	4	5	10	11
Virginia	....	....	....	....	3	3	....	7	....	8	7	22	25	28	33
Washington	48	1	....	108	2	159	9	....	....	20	....	29	188	231	277
Wisconsin	....	1	9	....	....	10	....	6	21	....	1	28	38	61	77
Wyoming	16	....	....	34	4	54	1	1	....	1	3	6	60	71	74
Total, 1914	371	15	67	2,356	78	2,887	214	181	181	1,180	162	1,918	4,805	.....	.....
Total, 1913	395	18	93	2,588	105	3,199	299	188	316	2,161	224	3,188	.....	6,387	.....
Total, 1912	455	20	137	2,848	126	3,586	359	174	327	1,289	232	2,381	.....	.....	5,967

[a] Placer mines not included.

TABLE 15.—*Percentages of deaths in and about all* ***metal*** *and* ***miscellaneous mineral*** *mines (except coal mines) in the United States resulting from various causes during the calendar years 1914, 1913, 1912, and 1911.*

Cause of death.	Killed.								
	Copper mines.	Gold and miscellaneous metal mines.	Iron mines.	Lead and zinc mines (Mississippi Valley).	Miscellaneous mineral mines.	Average for all mines, 1914.	Average for all mines, 1913.	Average for all mines, 1912.	Average for all mines, 1911.
Fall of rock or ore from roof or wall	34.55	29.05	34.46	50.00	18.52	**33.09**	32.21	32.10	**27.48**
Rock or ore while loading at working face	1.21	.56	2.02	2.50	.....	**1.25**	1.46	.30	.....
Timber or hand tools	.61	.....	.68	2.50	.....	**.54**	1.17	.90	**1.44**
Explosives	8.48	12.29	5.41	10.00	3.70	**8.76**	11.28	11.04	**8.92**
Haulage accidents	6.06	3.35	8.78	.....	7.41	**5.55**	5.13	5.29	**2.88**
Falling down chute, winze, raise, or stope	13.33	11.73	3.38	.....	.....	**8.59**	7.62	6.50	**6.76**
Run of ore from chute or pocket	2.42	.56	.....	.....	.....	**.89**	1.46	1.51	**2.01**
Drilling accidents	.61	1.12	.....	.....	.....	**.54**	.....	.30	.....
Electricity	3.03	1.67	.....	.....	.....	**1.43**	2.34	2.87	**2.16**
Machinery (not including locomotives or drills)	.....	.....	.....	2.50	.....	**.18**	.58	.30	**1.44**
Mine fires	1.21	2.24	1.35	5.00	.....	**1.79**	.....	.15	**5.32**
Suffocation from natural gases	.....	.56	.....	.....	.....	**.18**	.44	.61	**1.15**
Inrush of water	.....	.....	5.41	.....	.....	**1.43**	.....	.76	**1.73**
Stepping on nail	.....	.....	.....	.....	.....	.....	.....	.....	.....
Other causes	.61	1.67	1.35	2.50	.....	**1.25**	3.37	1.21	**1.44**
Total killed underground	**72.12**	**64.80**	**62.84**	**75.00**	**29.63**	**65.47**	**67.06**	**63.84**	**62.73**
Falling down shafts	4.85	7.26	6.76	7.50	.....	**6.08**	3.81	6.05	**8.20**
Objects falling down shafts	1.21	1.12	2.70	5.00	.....	**1.79**	2.20	1.82	**2.59**
Breaking of cables	.....	1.12	.....	.....	.....	**.36**	.29	.30	**.58**
Overwinding	.....	.....	.....	.....	.....	.....	.44	.....	.....
Skip or cage	9.09	10.61	4.72	5.00	.....	**7.70**	4.98	5.60	.....
Other causes	1.82	1.12	4.06	.....	.....	**1.96**	1.46	1.36	**3.88**
Total killed in shaft	**16.97**	**21.23**	**18.24**	**17.50**	.....	**17.89**	**13.18**	**15.13**	**15.25**
Mine cars or mine locomotives	1.21	.....	.68	.....	.....	**.54**	1.32	.91	**.58**
Railway cars or locomotives	1.21	1.12	.68	.....	7.41	**1.25**	.58	.76	**1.15**
Run or fall of ore in or from ore bins	.....	1.12	1.35	.....	3.70	**.89**	.29	.30	**.43**
Falls of persons	.61	.....	2.02	.....	.....	**.72**	.73	.91	.....
Stepping on nail	.....	.....	.....	.....	.....	.....	.15	.....	.....
Hand tools, axes, bars, etc	.....	.....	.....	.....	.....	.....	.....	.....	.....
Electricity	.....	1.67	.68	.....	7.41	**1.07**	.73	.76	**.29**
Machinery	.....	1.12	.68	2.50	.....	**.72**	1.61	1.66	**1.15**
Other causes	1.82	1.12	1.35	2.50	.....	**1.43**	1.76	3.63	**6.04**
Total killed on surface (shops and power plants)	**4.85**	**6.15**	**7.44**	**5.00**	**18.52**	**6.62**	**7.17**	**8.93**	**9.64**
Falls or slides of rock or ore	.61	1.67	4.72	.....	25.93	**3.22**	2.49	2.42	**5.04**
Explosives	3.63	1.67	1.35	.....	.....	**1.96**	1.76	3.17	**2.31**
Haulage accidents	1.82	.56	3.37	.....	.....	**1.61**	4.39	3.03	**3.02**
Steam shovels	.....	.....	.68	.....	.....	**.18**	.29	.61	**.14**
Falls of persons	.....	1.12	.68	.....	3.70	**.72**	.15	.45	**.43**
Falls of derricks, booms, etc	.....	.56	.....	.....	.....	**.18**	.15	.30	**.14**
Run or fall of ore in or from ore bins	.....	.....	.....	.....	.....	.....	.....	.....	.....
Machinery (other than locomotives or steam shovels)	.....	.56	.68	.....	11.11	**.89**	1.46	.91	**.43**
Electricity	.....	1.12	.....	.....	3.70	**.54**	.73	.15	.....
Hand tools	.....	.....	.....	.....	.....	.....	.....	.....	.....
Other causes	.....	.56	.....	2.50	7.41	**.72**	1.17	1.06	**.87**
Total killed in open pit	**6.06**	**7.82**	**11.48**	**2.50**	**51.85**	**10.02**	**12.59**	**12.10**	**12.38**
	100.00	100.00	100.00	100.00	100.00	**100.00**	100.00	100.00	**100.00**

TABLE 16.—*Percentages of injuries in and about all* ***metal*** *and* ***miscellaneous min*** *the calendar years*

Causes of injury.	Seriously injured.				
	Copper mines.	Gold and miscellaneous metal mines.	Iron mines.	Lead and zinc mines (Mississippi Valley).	Miscellaneous mineral mines.
Fall of rock or ore from roof or wall	23.86	28.43	16.91	34.93	7.03
Rock or ore while loading at working face	13.21	4.94	6.21	2.74	7.03
Timber or hand tools	6.97	6.81	11.29	2.06	3.91
Explosives	2.01	4.06	2.27	4.11	3.13
Haulage accidents	12.86	11.63	14.43	13.01	11.72
Fall down chute, winze, raise, or stope	3.98	5.38	3.03	2.74	.78
Run of ore from chute or pocket	1.77	1.65	2.27	.....	.....
Drilling accidents	3.19	5.16	2.86	2.06	5.47
Electricity	.05	.....	.16	.....	.78
Machinery (not including locomotives or drills)	.44	2.08	.60	2.74	1.56
Mine fires	.....	.44	.....	.....	.....
Suffocation from natural gases	.....	.....	.16	.....	.....
Inrush of water	.....	.....	.....	.....	.....
Stepping on nail	.20	.22	.33	.....	.....
Other causes	11.09	8.12	7.83	8.22	.78
Total injured underground	**79.63**	**78.92**	**68.35**	**72.61**	**42.19**
Falling down shafts	.39	.66	.43	2.06	.....
Objects falling down shafts	.59	.66	.49	2.06	.....
Breaking of cables	.....	.33	.....	.....	.....
Overwinding	.....	.....	.05	.....	.....
Skip or cage	1.47	1.97	1.30	2.74	.....
Other causes	1.18	1.21	.70	1.36	.....
Total injured in shaft	**3.63**	**4.83**	**2.97**	**8.22**	.....
Mine cars or mine locomotives	1.18	1.10	1.62	1.36	.....
Railway cars or locomotives	.20	.22	.54	.69	.78
Run or fall of ore in or from ore bin	.49	.33	.22	1.36	1.56
Falls of persons	1.57	1.10	3.24	2.74	3.91
Stepping on nail	.20	.....	.16	.69	.....
Hand tools, axes, bars, etc	2.16	1.43	1.57	3.43	.78
Electricity	.10	.11	.....	.....	.....
Machinery	1.67	2.85	2.05	4.11	2.34
Other causes	3.43	2.63	3.89	4.79	6.25
Total injured on surface (shops and power plants)	**11.00**	**9.77**	**13.29**	**19.17**	**15.62**
Falls or slides of rock or ore	1.03	.22	2.81	.....	10.16
Explosives	.83	.44	.91	.....	.....
Haulage accidents	1.23	.11	2.32	.....	7.03
Steam shovels	.24	.....	1.45	.....	.....
Falls of persons	.29	1.10	1.30	.....	2.34
Falls of derricks, booms, etc	.05	.....	.22	.....	2.34
Run or fall of ore in or from ore bins	.....	.....	.....	.....	.....
Machinery (other than locomotives or steam shovels)	.19	2.08	.33	.....	7.03
Electricity	.10	.....	.....	.....	.....
Hand tools	.20	.99	1.35	.....	4.69
Other causes	1.28	1.54	4.70	.....	8.60
Total injured in open pit	**5.74**	**6.48**	**15.39**	.....	**42.19**
	100.00	100.00	100.00	100.00	100.00

eral *mines (except coal mines) in the United States resulting from various causes during 1914, 1913, 1912, and 1911.*

Seriously injured—Cont'd.				Slightly injured.								
Average for all mines, 1914.	Average for all mines, 1913.	Average for all mines, 1912.	Average for all mines, 1911.	Copper mines.	Gold and Miscellaneous metal mines.	Iron mines.	Lead and zinc mines (Mississippi Valley).	Miscellaneous mineral mines,	**Average for all mines, 1914.**	Average for all mines, 1913.	Average for all mines, 1912.	Average for all mines, 1911.
22.04	21.39	24.48	29.12	22.32	20.60	17.61	15.70	3.36	**19.83**	20.14	22.42	26.96
8.71	5.43	5.80	(a)	14.42	9.10	11.01	14.64	8.89	**12.37**	8.36	10.95	(a)
8.30	9.69	6.95	6.41	8.48	9.94	11.46	4.30	3.36	**9.18**	11.90	9.70	8.02
2.56	2.24	3.40	3.33	.74	.75	.62	2.37	.67	**.81**	.90	.94	1.08
13.19	13.89	12.86	14.54	9.54	10.73	12.18	10.84	5.54	**10.48**	11.14	10.41	13.05
3.76	3.84	4.46	3.86	3.11	3.71	1.24	1.00	.50	**2.51**	2.66	2.82	3.33
1.83	2.46	2.51	2.52	2.49	2.79	1.98	.37	.....	**2.21**	3.59	3.54	3.91
3.45	3.72	4.51	4.56	4.54	7.87	4.62	5.42	3.69	**5.22**	4.73	5.38	5.39
.10	.12	.16	.07	.18	.09	.25	.19	.50	**.19**	.19	.12	.13
.89	1.46	1.13	2.54	.45	.96	.61	1.12	.50	**.63**	1.48	1.60	2.57
.08	.10	.02	.....	.01	.02	.....	.....	.....	**.01**	.02	.04	.11
.06	.05	.11	.02	.03	.23	.07	.....	.....	**.08**	.07	.11	.08
.....	.15	.07	.....	.....	.....	.17	.....	.....	**.05**	.03	.03	.06
.23	.31	.20	(a)	.92	.72	1.07	.50	.34	**.88**	1.11	.89	(a)
9.03	7.22	5.97	7.63	13.71	13.43	10.92	22.62	3.86	**13.23**	9.55	10.38	14.04
74.23	**72.07**	**72.63**	**74.60**	**80.94**	**80.94**	**73.81**	**79.07**	**31.21**	**77.68**	**75.87**	**79.33**	**78.73**
.49	.68	.78	1.01	.07	.19	.06	.25	.....	**.10**	.22	.26	.23
.59	.81	1.11	.96	.52	.71	.56	1.31	.....	**.61**	.74	.87	.96
.06	.02	.07	.05	.....	.13	.....	.....	.....	**.02**	.03	.01	.02
.02	.05	.....	.29	.....	.02	.01	.....	.....	**.01**	.02	.02	.06
1.50	1.36	1.57	(a)	.53	.53	.90	2.18	.34	**.73**	.51	.66	(a)
.99	.87	.40	1.36	.40	.49	.72	1.74	.....	**.58**	.36	.48	.84
3.65	**3.79**	**3.93**	**3.67**	**1.52**	**2.07**	**2.25**	**5.48**	**.34**	**2.05**	**1.88**	**2.30**	**2.11**
1.30	.65	.71	1.20	.72	.75	.78	.75	1.51	**.76**	.47	.53	.60
.36	.54	.60	.36	.16	.55	.29	.37	.84	**.30**	.36	.20	.19
.41	.08	.42	.38	.26	.23	.26	.56	1.00	**.29**	.18	.38	.44
2.19	1.55	1.93	(a)	.60	.83	1.97	.75	3.52	**1.10**	1.05	1.17	(a)
.16	.10	.14	(a)	.34	.40	.75	.87	2.35	**.54**	.45	.44	(a)
1.81	1.41	1.40	(a)	1.27	1.71	2.25	2.12	3.36	**1.73**	2.20	1.90	(a)
.06	.10	.09	.02	.07	.11	.10	.13	.17	**.09**	.06	.09	.10
2.11	1.82	2.31	2.21	.64	.96	1.10	1.12	2.35	**.90**	1.15	1.41	1.29
3.57	3.38	2.73	4.37	2.67	3.86	5.27	8.66	14.43	**4.27**	2.88	2.30	4.68
11.97	**9.63**	**10.33**	**8.54**	**6.73**	**9.40**	**12.77**	**15.33**	**29.53**	**9.98**	**8.80**	**8.42**	**7.30**
1.73	2.73	2.75	2.25	2.49	.91	1.32	.06	6.04	**1.80**	2.51	1.65	1.90
.75	.83	1.20	.98	.59	.02	.26	.....	1.00	**.37**	.57	.46	.49
1.53	2.14	1.71	2.95	1.21	.13	1.20	.....	4.19	**1.00**	1.30	1.15	1.68
.63	1.90	1.55	1.54	.41	.....	1.05	.....	.17	**.48**	.89	.91	.80
.85	1.43	1.02	1.20	1.23	.47	1.11	.06	2.51	**1.02**	1.24	1.08	1.33
.16	.19	.29	.24	.....	.....	.07	.....	.17	**.02**	.11	.13	.31
.....	.08	.02	.10	.01	.11	.....	.....	.34	**.03**	.09	.03	.04
.86	.53	.56	1.10	.44	1.66	.19	.....	3.86	**.65**	.58	.56	1.34
.04	.05	.14	.07	.02	.06	.....	.....	.17	**.02**	.04	.03	.04
.86	1.59	1.00	(a)	.78	2.38	1.66	.....	5.37	**1.38**	1.68	1.26	(a)
2.74	3.04	2.87	2.76	3.63	1.85	4.31	.....	15.10	**3.52**	4.44	2.69	3.93
10.15	**14.51**	**13.11**	**13.19**	**10.81**	**7.59**	**11.17**	**.12**	**38.92**	**10.29**	**13.45**	**9.95**	**11.86**
100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	**100.00**	100.00	100.00	100.00

[a] Not listed as a separate cause in 1911.

TABLE 17.—*Number of men killed or injured per 1,000 employed in and about all* ***metal and miscellaneous mineral*** *mines (except coal mines) in the United States, based on the actual average number of days worked, compared with similar data based on a year of 300 working days.*[a]

State.	Average days worked, 1914.	Number of fatalities.		Number of serious injuries.		Number of slight injuries.	
		As reported.	On 300-day basis.	As reported.	On 300-day basis.	As reported.	On 300-day basis.
Alabama	274	4.78	5.24	38.66	42.34	241.15	264.10
Alaska[b]	257	2.38	2.78	6.63	7.75	25.88	30.25
Arizona	311	4.50	4.33	56.10	54.07	327.46	315.61
Arkansas and Louisiana	236	2.12	2.69	19.07	24.19	230.93	293.01
California	279	4.20	4.51	32.07	34.43	152.34	163.57
Colorado	300	5.09	5.09	12.35	12.35	82.14	82.14
Connecticut	180	.....	.....	9.26	15.38	13.89	23.08
Florida	235	3.47	4.42	6.59	8.39	59.62	75.97
Georgia	159	3.28	6.21	.....	.....	65.57	124.22
Idaho	260	4.76	5.49	21.78	25.02	99.26	114.35
Illinois	213	.....	.....	10.20	14.37	108.16	152.30
Iowa	224	.....	.....	32.03	42.86	106.76	142.86
Kansas	214	3.17	4.44	12.70	17.78	47.62	66.67
Kentucky	138	9.05	19.61	4.52	9.80	18.10	39.22
Maine	237	.....	.....	.....	.....	.....	.....
Maryland	201	.....	.....	14.49	21.74	43.48	65.22
Massachusetts	273	.....	.....	64.52	71.43	129.03	142.86
Michigan	274	3.63	3.97	48.14	52.71	183.26	200.64
Minnesota	249	2.43	2.93	48.89	58.98	144.79	174.70
Missouri	257	2.95	3.44	9.67	11.28	150.12	175.15
Montana	260	2.99	3.45	23.23	26.84	163.65	189.11
Nevada	298	3.23	3.25	29.03	29.26	90.60	91.31
New Hampshire	226	.....	.....	26.32	34.48	.....	.....
New Jersey	297	2.93	2.97	29.37	29.70	259.91	262.81
New Mexico	265	2.06	2.33	18.98	21.47	96.95	109.66
New York	278	3.66	3.96	33.31	35.98	129.91	140.34
North Carolina	220	8.05	10.96	28.17	38.36	85.51	116.44
Ohio	264	.....	.....	31.25	35.50	140.63	159.76
Oklahoma	254	5.03	5.94	6.71	7.92	135.91	160.40
Oregon	163	.78	1.44	7.04	12.95	26.58	48.92
Pennsylvania	246	.....	.....	9.41	11.46	14.12	17.19
South Carolina	185	.....	.....	14.42	23.35	16.83	27.24
South Dakota	317	2.17	2.06	29.88	28.32	279.20	264.68
Tennessee	236	5.53	7.03	25.82	32.83	176.45	224.31
Texas	301	.....	.....	2.89	2.88	54.91	54.76
Utah	320	4.97	4.65	27.41	25.68	253.21	237.20
Vermont	265	.....	.....	53.57	60.61	44.64	50.51
Virginia	266	1.07	1.20	9.59	10.84	60.74	68.63
Washington	137	.....	.....	4.62	10.15	19.65	43.15
Wisconsin	250	4.27	5.13	41.15	49.42	147.90	177.62
Wyoming	204	.....	.....	.....	.....	4.17	6.12
Total, 1914	**271**	**3.54**	**3.92**	**32.08**	**35.57**	**159.02**	**176.29**
Total, 1913	288	3.57	3.72	30.79	32.09	141.58	147.54
Total, 1912	287	3.91	4.09	26.61	27.85	155.04	162.26
Total, 1911	282	4.19	4.45	25.12	26.71	135.01	143.56

[a] For details giving number killed, number employed, and days worked, see Table 5; for number injured, see Table 13.

[b] Serious and slight injuries not reported for Alaska placers, hence low injury ratio.

TABLE 18.– *Comparison, by years, of the number of men employed in the metal mines of the principal countries, showing the fatality rate per 1,000 persons employed.*[a]

Country.	1907			1908			1909			1910			1911			1912			1913			1914		
	Number employed.	Number killed.	Number killed per 1,000 employed.	Number employed.	Number killed.	Number killed per 1,000 employed.	Number employed.	Number killed.	Number killed per 1,000 employed.	Number employed.	Number killed.	Number killed per 1,000 employed.	Number employed.	Number killed.	Number killed per 1,000 employed.	Number employed.	Number killed.	Number killed per 1,000 employed.	Number employed.	Number killed.	Number killed per 1,000 employed.	Number employed.	Number killed.	Number killed per 1,000 employed.
Australasia:																								
New South Wales	26,402	24	0.91	20,881	32	1.53	17,836	20	1.12	19,369	29	1.50	19,360	35	1.81	19,807	31	1.57	19,914	30	1.51	.....	.....	.....
New Zealand	9,389	7	40.75	8,880	15	1.69	7,651	14	1.83	8,121	15	1.85	7,400	5	.68	5,239	5	.95	.....	.....	.....	.....	.....	.....
Queensland	15,416	13	.84	13,759	29	2.11	12,050	26	2.16	12,342	18	1.46	11,091	10	.90	10,608	26	2.45	9,978	11	1.10	7,853	9	1.14
Tasmania[b]	7,516	6	.80	6,464	6	.93	6,054	6	.99	5,770	8	1.39	5,247	4	.76	5,566	53	9.52	6,106	6	.98	4,741	9	1.90
Victoria	23,291	27	1.16	20,853	19	.91	18,671	15	.80	16,553	12	.72	14,051	19	1.35	11,856	16	1.35	11,931	9	.75	.....	.....	.....
Western Australia	16,058	42	2.62	16,075	40	2.49	17,027	33	1.94	16,279	27	1.66	15,428	36	2.33	13,700	34	2.48	13,445	24	1.79	12,110	26	2.15
Austria	20,411	21	1.03	20,235	10	.49	19,582	19	.97	19,621	16	.82	19,934	10	.50	20,890	20	1.00	.....	.....	.....	.....	.....	.....
France	24,197	55	2.27	24,179	51	2.11	24,436	73	2.99	27,183	86	3.16	29,998	85	2.84	31,602	104	3.29	.....	.....	.....	.....	.....	.....
Germany	98,441	155	1.57	97,062	115	1.18	93,928	91	.97	93,645	141	1.51	92,964	148	1.59	93,591	173	1.85	.....	.....	.....	.....	.....	.....
Great Britain	31,602	34	1.08	29,927	37	1.24	28,437	40	1.41	28,676	43	1.50	29,025	43	1.48	28,058	43	1.53	27,412	32	1.16	23,709	24	1.01
Greece	11,720	23	1.96	.....	.....	.....	8,389	13	1.55	6,933	9	1.30	6,764	14	2.07	6,180	12	1.94	.....	.....	.....	.....	.....	.....
Italy	59,597	113	1.90	.....	.....	.....	52,648	69	1.31	49,995	59	1.18	49,498	117	2.36	48,225	71	1.47	.....	.....	.....	.....	.....	.....
Japan	85,663	113	1.32	75,590	70	.93	81,312	138	1.70	84,728	118	1.39	80,896	142	1.76	81,921	129	1.57	.....	.....	.....	.....	.....	.....
Mexico[d]	92,421	479	5.18	85,107	395	4.64	81,438	471	5.78	.....	.....	.....	36,641	265	7.23	12,678	39	3.08	.....	.....	.....	.....	.....	.....
Peru[d]	16,936	.....	.....	17,349	40	2.31	17,580	21	1.19	20,410	118	5.78	.....	32	.....	14,435	54	2.90	.....	.....	.....	.....	.....	.....
Portugal	3,928	10	2.55	6,991	9	1.29	7,858	11	1.40	6,554	11	1.68	7,484	10	1.34	7,769	7	.93	.....	.....	.....	.....	.....	.....
Russia	194,916	155	.80	191,334	178	.93	200,844	.....	.....	202,132	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Spain[e]	155,792	304	1.95	147,581	275	1.86	150,681	282	1.87	155,182	256	1.65	143,863	180	1.25	149,884	260	1.73	.....	.....	.....	.....	.....	.....
Sweden[f]	14,204	.....	.....	14,628	16	1.09	13,238	16	1.21	13,775	23	1.73	14,216	.....	.....	14,658	.....	.....	.....	.....	.....	.....	.....	.....
Transvaal	168,991	805	4.76	181,637	761	4.19	192,038	1,018	5.30	205,687	882	4.29	225,538	934	4.14	240,000	900	3.75	223,380	851	3.81	.....	.....	.....
United States	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	165,979	695	4.19	169,199	661	3.91	191,276	683	3.57	158,115	557	3.52

[a] Compiled from official reports.
[b] Figures for mines in Tasmania also cover coal mines and smelting works. The high rate for 1912 is due to one disastrous mine fire.
[c] Figures cover only mines coming under the "Metalliferous Mines Regulation Act."
[d] Figures also cover coal mines.
[e] Figures also cover coal mines in which about 25,000 men are employed and metallurgical works employing about 25,000 men annually.
[f] Figures also cover coal mines and quarries.

TABLE 19.—*Number of men employed, number of days worked, and number of men killed per 1,000 employed in and about all* ***metal*** *and* ***miscellaneous mineral*** *mines (except coal mines) in the different States during the calendar year 1913 (revised).*

State.	Number of active operators.	Number of employees.			Days' work done.	Average number of days worked.	Number killed.						Widows.	Orphans.
		Underground.	On the surface.	Total.			Underground.[a]	Per 1,000 employed.	On the surface.	Per 1,000 employed.	Total.	Per 1,000 employed.		
Alabama	24	3,351	1,861	5,212	1,485,189	285	18	5.37	1	2.15	**22**	4.22	9	16
Alaska [b]	350	5,925	2,075	8,000	2,096,782	263	19	3.21	6	2.89	**25**	3.13	2	3
Arizona	426	13,031	3,458	16,489	5,194,231	315	84	6.45	2	.58	**86**	5.22	35	27
Arkansas	8	28	309	337	87,046	258								
California	1,054	7,437	4,039	11,476	3,115,698	271	40	5.38	12	2.97	**52**	4.53	21	25
Colorado [c]	1,013	14,382	1,567	15,949	4,767,651	299	41	2.85	3	1.91	**44**	2.76	19	
Connecticut	5	147	108	255	74,004	290								
Florida	27	18	4,520	4,538	1,150,313	253			14	3.10	**14**	3.09	3	10
Georgia	21	131	313	444	101,867	229			1	3.19	**1**	2.25		
Idaho	588	4,006	1,673	5,769	1,634,392	283	20	4.88	4	2.39	**24**	4.16	1	4
Illinois	12	317	194	511	135,732	266	1	3.15			**1**	1.96	1	1
Iowa	9	215	16	231	61,012	264								
Kansas	40	440	168	608	147,034	242	4	9.09			**4**	6.58	3	
Kentucky	15	228	288	516	94,493	183								
Maine	5		121	121	32,178	266								
Maryland	16	14	345	359	104,195	290								
Massachusetts	3	34	14	48	14,028	292								
Michigan	84	19,531	8,643	28,174	7,878,782	280	74	3.79	8	.92	**82**	2.91	45	133
Minnesota	54	8,937	10,609	19,546	5,976,512	306	35	3.92	28	2.64	**63**	3.22	32	64
Missouri	283	7,053	2,694	9,747	2,454,713	252	24	3.40	10	3.71	**34**	3.49	19	44
Montana	384	15,192	4,308	19,500	6,177,500	317	57	3.75	7	1.62	**64**	3.28	32	54
Nevada	566	4,948	2,368	7,316	2,242,654	307	19	3.84	6	2.53	**25**	3.42	8	10
New Hampshire	7	18	65	83	16,010	193								
New Jersey	7	1,072	361	1,433	443,973	310	8	7.46			**8**	5.58	5	14
New Mexico	139	2,015	1,751	3,766	914,038	243	16	7.94	12	6.85	**28**	7.43	11	16
New York [d]	36	2,237	1,108	3,345	930,515	278	12	5.36	2	1.81	**14**	4.19	6	13
North Carolina	60	756	411	1,167	228,245	186	4	5.16			**4**	3.43	2	3
Ohio	7	280	25	305	85,807	281								
Oklahoma	36	368	273	641	148,132	231	1	2.72			**1**	1.56	1	1
Oregon	261	709	640	1,349	262,126	194	3	4.23			**3**	2.22	2	2
Pennsylvania	34	111	545	656	171,463	261								
South Carolina	6	22	422	444	96,985	318								
South Dakota	74	1,441	650	2,091	720,169	344	6	4.16	2	3.08	**8**	3.83	3	5
Tennessee	36	1,275	1,876	3,151	829,277	263	9	7.06	1	.53	**10**	3.17	5	9
Texas	8	241	109	350	102,695	291			1	9.17	**1**	2.86	1	3
Utah	285	4,799	3,073	7,872	2,541,022	323	29	6.04	7	2.28	**36**	4.59	7	10
Vermont	10	76	67	143	33,236	232	1	13.16			**1**	6.99	1	1
Virginia	28	1,129	1,467	2,596	710,805	274	10	8.86	2	1.36	**12**	4.62	7	18
Washington	231	843	459	1,302	260,828	200	4	4.74			**4**	3.07	1	2
Wisconsin	61	3,267	1,063	4,330	1,245,478	288	9	2.75	2	1.88	**11**	2.54	3	10

Wyoming	71	255	361	616	135,280	220								
Other States [e]	3		490	490	175,705	359			1	2.04	1	2.04	1	3
Total, 1913	**6,387**	**126,369**	**64,907**	**191,276**	**55,077,855**	**288**	**548**	**4.34**	**135**	**2.08**	**683**	**3.57**	**286**	**501**
Total, 1912	5,967	110,056	59,143	169,199	48,498,510	287	522	4.74	139	2.35	**661**	3.91	273	520
Total, 1911	5,232	104,623	61,356	165,979	46,826,573	282	542	5.18	153	2.49	**695**	4.19	297	600

[a] Includes those killed in shaft accidents.
[b] Reported by Sumner S. Smith, United States mine inspector, Juneau, Alaska.
[c] Reported by T. R. Henahen, commissioner of metalliferous mines, Denver, Colo.
[d] Reported by W. W. Jones, State mine inspector, Albany, N. Y.
[e] Includes Louisiana, Rhode Island, and West Virginia.

TABLE 20.—*Number of men employed, number of days worked, and number of men killed per 1,000 employed in and about the* ***gold*** *and* ***miscellaneous metal*** *mines in the United States during the calendar year 1913 (revised).*

State.	Number of active operators.	Number of employees.			Days' work done.	Average number of days worked.	Number killed.						Widows.	Orphans
		Underground.	On the surface.	Total.			Underground.[a]	Per 1,000 employed.	On the surface.	Per 1,000 employed.	**Total.**	Per 1,000 employed.		
Alabama	3	25	65	90	25,032	278								
Alaska	337	5,690	1,875	7,565	1,951,125	258	19	3.34	6	3.20	**25**	3.30	2	3
Arizona	239	1,349	635	1,984	467,090	235	12	8.90			**12**	6.05	5	9
California	990	6,039	3,465	9,504	2,538,133	267	31	5.13	11	3.17	**42**	4.42	16	20
Colorado [b]	1,013	14,382	1,567	15,949	4,767,651	299	41	2.85	3	1.91	**44**	2.76	19	
Georgia	8	61	134	195	40,816	209								
Idaho	522	3,633	1,538	5,171	1,472,143	285	17	4.68	4	2.60	**21**	4.06	1	2
Montana	309	1,812	781	2,593	669,174	258	2	1.10	2	2.56	**4**	1.54	2	
Nevada	487	3,884	1,405	5,289	1,591,057	301	15	3.86			**15**	2.84	5	7
New Mexico	97	1,442	538	1,980	330,739	167	9	6.24			**9**	4.55	3	1
New York [c]	3	105	24	129	37,539	291								
North Carolina	13	216	84	300	78,675	262	2	9.26			**2**	6.67	1	2
Oregon	235	596	451	1,047	217,067	207	3	5.03			**3**	2.87	2	2
South Dakota	67	1,422	620	2,042	714,766	350	6	4.22	2	3.23	**8**	3.92	3	5
Texas	3	216	47	263	82,130	312			1	21.28	**1**	3.80	1	3
Utah	206	2,514	551	3,065	890,780	291	9	3.58			**9**	2.94		
Virginia	7	236	233	469	137,838	294	6	25.42	1	4.29	**7**	14.93	3	8
Washington	158	436	208	644	92,240	143	2	4.59			**2**	3.11	1	2
Wyoming	43	76	90	166	20,383	123								
Other States [d]	9	676	380	1,056	309,230	293	6	8.88			**6**	5.68	3	6
Total, 1913	**4,749**	**44,810**	**14,691**	**59,501**	**16,433,608**	**276**	**180**	**4.02**	**30**	**2.04**	**210**	**3.53**	**67**	**70**
Total, 1912	4,137	31,322	12,822	44,144	12,229,761	277	147	4.69	29	2.26	**176**	3.99	71	98
Total, 1911	3,817	35,176	13,743	48,919	13,512,633	276	163	4.63	30	2.18	**193**	3.95	61	118

[a] Includes those killed in shaft accidents.
[b] Reported by T. R. Henahen, commissioner of metalliferous mines, Denver, Colo.
[c] Reported by W. W. Jones, State mine inspector, Albany, N. Y.
[d] Includes Arkansas, New Jersey, Oklahoma, South Carolina, Tennessee, and Wisconsin.

DETERMINATION OF NUMBER OF MEN EMPLOYED.

Although the bureau's request for information on which to base this report called for the average number of men employed during the year, it is possible that some of the companies, especially the smaller ones, may have reported the number of men on the pay roll rather than the average number at work full time. Unless exact records are kept, it is not easy to determine the average number of men actually at work during a year. The number of days a mine is operated and the number of deaths that occur are known and are reported. The number of men on the pay roll is also known, but the average number of men at work during the year must be calculated on the basis of the total number of shifts or days' labor (man-shifts per year) performed. With this figure as a basis the average number of men at work full time, and the average number of days worked per man per year may be obtained thus:

Let a=total actual man-shifts for which wages were paid during the year, as shown on pay roll,
b=number of men on pay roll,
c=number of days mine was operated during the year,
x=average number of men at work (full time basis),
y=average number of shifts (days) worked per man per year;

then $x=\frac{a}{c}$=average number of men at work during the year, and

$y=\frac{a}{b}$=average number of shifts (days) worked per year per man.

BASIS FOR COMPUTING FATALITY RATES.

The customary basis for computing fatality rates is the number of men employed in the industry. This basis is faulty in so far as under existing conditions the exact number of men actually at work can not be obtained because all the men do not work full time. In every mining district there are men who work a few days at one mine and either quit or are discharged, and go to another mine. The actual number of men on the pay roll of any mine is, therefore, much larger than the number of men at work, and unfortunately it is the pay roll total that the operators too frequently report. The figure for number of men employed is also imperfect in that the number of working hours a day are not considered. At most metal mines the 8-hour day prevails, whereas at others 9 or 10 hours constitute a legal day.

The comparison of fatality rates on a percentage basis is far from being correct. For example, there may be 1,000 fatalities due to various causes in a certain group of mines, 500 (50 per cent) of which may be attributed to some one cause, as falls of rock, and 25 per cent to a serious disaster, in which 250 men are killed. The defect with the percentage basis is that the number killed in a large disaster enters into the total number of men killed for that particular group of

mines. When the total is thus increased the percentage for all other causes is decreased. In the instance above cited in which 25 per cent of the fatalities was due to a mine disaster, eliminating this particular accident from the total would leave only 750 fatalities, and although the number of fatalities from falls of rock (500) remained unchanged the percentage would be 50 per cent in one case, and 66.7 per cent in the other.

FATALITY RATES ON TONNAGE BASIS.

To compare fatalities on a tonnage basis is open to the criticism that mining conditions are not the same in all mines or in all States. One mine may be working an ore body that is large and massive and another a vein a few inches to a few feet thick. Evidently a man in a year can mine much more ore from a wide ore body than from a thin vein. Also, the output per man varies with the mining method used, and this is largely determined by the type of ore body. The fact that the man in the large ore body can produce more tons per year than his fellow worker in the narrow ore body shows a lower fatality rate on the tonnage basis, although the two men were exposed to the mining risk the same number of days per year. As a matter of fact, the narrower ore body, as indicated in figure 1 on page 60, is the safer of the two, whereas on a tonnage basis it would be rated as more hazardous.

IMPORTANCE OF CONSIDERING TIME ELEMENT.

Although each method of determining fatality rates has its champion, yet for showing the true hazards that method serves best which takes into consideration both the number of men and the time they were at work. The ideal method would be for the operators to report the actual number of hours of labor for which wages were paid during the year. This, divided by 3,000, would give the equivalent number of men who were exposed to the mining hazard for 300 ten-hour shifts. For comparative purposes the standard year of 3,000 hours can easily be converted to a year of 2,000 or 2,500 hours.

Clearly, in comparing mine accidents, the time element must be taken into consideration. In other words, the length of time that a man is exposed to the mining risk should be an important factor in arriving at the true risk in the mining industry, and especially so when figures for one State are compared with those for another. The length of time during which miners are exposed to hazards varies in different States, owing both to commercial requirements and to agreements between miners and mine owners. The number of hours a day is largely regulated by local usage or by agreements and State laws, and the number of days worked a year depends largely on commercial conditions. When the demand for mineral products declines, the operators curtail the output by working the mines only part time or by

suspending work for several weeks to await better market conditions. Complete data, in the form outlined, are not as yet available for the metal-mining industry of the United States, but it is hoped that as compensation laws are enacted and State mine-inspection laws are revised these matters will be taken into consideration.

Data of this character, however, are available for a 10-year period in the coal mines of the United States. This information has been compiled in Table 21, in which differences in hours, number of employees, and working days have been given proper weight. The total number of hours worked in each State has been computed for the 10-year period, and their sum gives the total number of hours worked in all the States. This sum, divided by the number of men reported working, gives an average of 1,909 hours for the United States as a unit. The working hours in each State, divided by 2,000, gives the equivalent of 2,000-hour workers, upon which fatality rates may be based. The number of calculated 2,000-hour workers is tabulated in parallel with a column showing the number of employees as reported.

TABLE 21.—*Coal-mine fatality rates based on the number of 2,000-hour workers as compared with the rate based on the number of men reported as employed. (1903–1913, inclusive, except 1909.)*

State.	Days (10-hour) worked per year.	Actual number of men employed (10-year period).	Number of 2,000-hour workers.	Total fatalities in 10-year period.	Fatalities per 1,000.	
					Actual employees.	2,000-hour workers.
Alabama	225.5	211,382	238,316	1,379	6.52	5.78
Arkansas	131.4	[a] 39,006	24,611	92	2.36	3.74
Colorado	217.2	123,713	134,371	1,077	8.71	8.02
Illinois	156.7	664,866	521,053	1,701	2.55	3.26
Indiana	148.7	209,054	155,453	459	2.20	2.95
Iowa	170.4	157,415	134,128	305	1.94	2.27
Kansas	156.4	124,576	97,430	336	2.70	3.45
Kentucky	188.5	187,589	176,793	418	2.23	2.36
Maryland	242.8	[a] 47,611	57,957	104	2.18	1.79
Michigan	162.0	35,454	28,725	65	1.83	2.26
Missouri	153.9	95,056	73,154	124	1.30	1.70
Montana	193.0	29,887	28,840	122	4.08	4.23
New Mexico	246.3	29,776	36,669	433	14.54	11.81
North Dakota	197.4	[b] 3,188	3,244	13	4.08	4.01
Ohio	149.5	452,089	337,891	1,331	2.94	3.94
Oklahoma	140.6	84,418	63,009	429	5.08	6.81
Pennsylvania (anthracite)	198.5	1,668,725	1,655,961	6,219	3.73	3.76
Pennsylvania (bituminous)	203.4	1,573,200	1,599,843	5,340	3.39	3.34
Tennessee	210.0	112,247	117,869	381	3.40	3.23
Texas	210.1	[c] 19,405	20,043	21	1.08	1.05
Utah	210.9	25,084	26,451	104	4.15	3.93
Virginia	244.7	[c] 33,211	42,553	224	6.74	5.26
Washington	202.3	55,641	56,290	258	4.64	4.58
West Virginia	213.2	582,525	620,895	3,219	5.53	5.18
Wyoming	213.7	[b] 39,171	36,982	211	5.38	5.71
Total and average	190.9	6,604,289	6,288,531	24,365	3.69	3.87

[a] Employees and fatalities for eight years only.
[b] Employees and fatalities for five years only.
[c] Employees and fatalities for four years only.

COMMENTS ON TABULATED DATA.

Table 21 shows the number of working hours a year in the coal mines of each State, the number varying from 1,314 in Arkansas to 2,447 in Virginia. In the Pennsylvania anthracite field the number is 1,985 hours and in the Pennsylvania bituminous mines it is 2,034 hours. As this range varies from a few hours below to a few hours above 2,000, and as the average for the United States is 1,909 hours, a 2,000-hour year has been adopted for these calculations. It is more nearly in keeping with the actual conditions in the coal mines than would be a rate based on a 3,000-hour year, such as is frequently used in factories, metallurgical works, and other industrial plants. Anyone desiring figures on a 3,000-hour basis may obtain them by adding 50 per cent to all of the figures given in the table.

VARIATION IN DAYS WORKED PER YEAR.

The actual average number of working days in the coal mines varies from year to year in the same State. For example, in 1906 Colorado coal mines on an average were operated 268 days, whereas in 1911 the mines were operated 207 days. In 1903 the mines in Arkansas were operated on an average 223 days, whereas in 1910 the average was only 128 days. In Ohio the time varied from 161 days in 1908 to 206 days in 1913. With such wide differences in the number of days that the mines were in operation, it is evident that the hazards in each State were not the same.

Certainly it is not fair to place the fatality rate of an 8-hour State on an equal basis with a 10-hour State, because the men are exposed to the mining risk 25 per cent longer. Every hour adds 12½ per cent to the hazard as compared with that of an 8-hour day.

To illustrate the unfairness of comparing fatality rates without allowing for the length of exposure to hazards, Ohio and Montana may be taken. The fatality rate for Ohio coal mines, as shown in the table, based only on the actual number of men employed, was 2.94 per 1,000, and the corresponding rate for Montana was 4.08 per 1,000. By reduction to a common basis of 2,000 working hours per year the Ohio rate becomes 3.94 and the Montana rate 4.23, so that the difference on the 2,000-hour basis is 0.29 as compared with 1.14 per 1,000 on the customary basis. Similar comparisons may be made for other States. In Virginia many of the coal mines are worked 10 hours a day and 192 to 293 days a year, thus increasing the time of exposure and giving, on the customary basis, a fatality rate of 6.74, which, if reduced to a basis of the 2,000-hour year, becomes 5.26, comparing favorably with the rate in the

coal mines of West Virginia, where it is 5.18 per 1,000. Although the above figures are based on coal mining, the principles illustrated are applicable to any and all metal mines in the United States.

METAL-MINE FATALITY RATES COMPARED ON BASIS OF YEAR OF 300 WORKING DAYS.

A comparison of the fatality rates in the various groups of mines, based on a year of 300 working days, is given in Table 17. A 300-day year is used, as it more nearly corresponds to actual conditions at metal mines than does a 200-day year.

The table shows that a true comparison can not be made without reducing the number of days to a common denominator. In order to obtain the number of 300-day workers, it is necessary to know the total number of shifts (days) of labor performed during the year, as discussed on a preceding page. A still better comparison could be made if data showing actual number of hours' labor performed were available.

As a mine can be operated only about 300 days in a year, if Sundays, holidays, and a few days for repairs be excluded, a 300-day year has been used in this report, and a comparison of the accidents in the various States has been made on that basis. The average number of days actually worked at the mines in the various States during the year ranged from 138 in Kentucky to 320 in Utah, the average for the United States being 271 days.

The first column (Table 17) under "Fatalities" gives the rate as obtained from the actual number of men reported as working, and the second column gives the rate when the number of employees is reduced to the equivalent of 300-day workers. For example, the number of days worked in Michigan was 274, which gives a fatality rate of 3.63 per 1,000 men employed. Utah shows 320 days worked, with a fatality rate of 4.97. This comparison is not fair, inasmuch as the men in Utah were subjected to the hazards of mining 46 days longer than in Michigan. If the rate of each is reduced to the 300-day basis the rate for Michigan becomes 3.97 and for Utah 4.65. Similar comparisons may be made for other States.

Japan and France report the total number of shifts of labor performed during the year, making possible comparisons on the 300-day basis. Until all countries have a common system of reporting, classifying, and publishing mine-accident statistics, no true comparisons for all can be made. It is hoped that all mining countries will eventually adopt a uniform year upon which to base their accident ratios.

Comparison of fatality rates in 1914 in the various branches of the mineral industry in the United States, on both the actual time basis and on the 300-day basis, are given in the accompanying table.

Fatality rates in different branches of mineral industries in 1914 compared on a 300-day basis.

(Length of shift not considered).

Branch of mineral industry.	Actual days active.	Employees.		Days' labor performed.	Killed.	Number killed per 1,000 employed.	
		Actual.	On 300-day basis.			On actual basis.	On 300-day basis.
Metal mines	271	158,115	142,619	42,785,840	559	3.54	3.92
Ore-dressing plants	302	14,501	14,576	4,372,720	23	1.59	1.58
Smelting plants	349	26,960	31,384	9,415,236	33	1.22	1.05
Coal mines	207	763,185	526,598	157,979,295	2,454	3.22	4.67
Coke ovens	286	22,313	21,241	6,372,259	45	2.02	2.12
Quarries	233	87,936	68,187	20,456,157	180	2.05	2.64

ACCIDENTS CLASSIFIED BY MINING METHODS.

Inasmuch as systems and methods of mining differ, some methods must necessarily be more dangerous than others.

Data relating to the classification of mine accidents, based on specific systems of mining, are lacking, and in order that the comparative risk in the different methods might be ascertained, the report cards sent to the operators at the close of 1914 requested that the method of mining be reported with the statistics of accidents. With these reports as a basis, the bureau has been able to select the returns from 258 mining companies, representing about 75 per cent of the metal-mining industry, whose records appear reasonably complete. Reports from companies whose data were not complete in all details were omitted in making this study. The figures given herein, therefore, include the actual number of men (75,453) employed underground and in open-pit mines, with the corresponding number of accidents for each group. (See Table 24.)

In the tabulation of accidents (Tables 22, 23, and 24) with reference to the mining method, the employees around shops and surface works have been eliminated, as well as the corresponding number of accidents. There seems to be no reason why the hazard at the surface plant of a room-and-pillar mine should be any different from that at a mine where overhand stoping is the principal method employed.

In one mine the principal method of mining may be overhand stoping; but to a certain degree there must necessarily be some underhand stoping, a small amount of filling, and some room-and-pillar work. The methods as classified have been grouped, therefore, according to the principal method used, and in the majority of the cases represent 80 or 90 per cent of the total work at the individual properties. For the purpose of studying the mining risk, the returns received from the operators have been divided into six groups, representing the principal mining methods, as follows:

1. Overhand stoping, confined to narrow veins.
2. Overhand stoping, confined to wide veins and large ore bodies.

3. Room-and-pillar method (without timber).
4. Caving systems and their various modifications.
5. Open pit, with steam shovel.
6. Open pit, without steam shovel.

These different methods have been developed to work different types and classes of ore bodies, and inasmuch as ore bodies are fixed and definite, it is necessary to modify mining methods to meet the

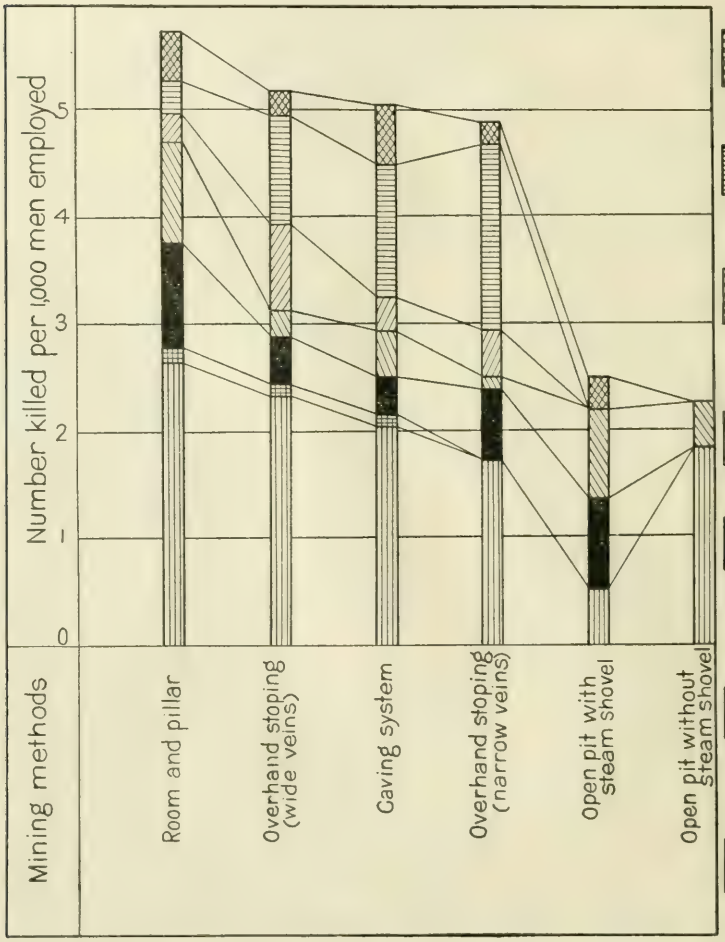

FIGURE 1.—Fatality rates compared by causes of accidents and by mining methods.

requirements of each ore body if the ore is to be extracted at minimum cost and with least loss. Safety should be the first consideration, although many other factors have to be taken into account in laying out a mine.

Figure 1 shows fatality rates compared by causes of accidents and by mining methods. Figure 2 shows a similar comparison for injury rates.

OVERHAND STOPING (NARROW VEINS).

The figures covering overhand stoping in narrow veins are made up from the reports of 64 companies in 12 States, employing 9,177 men actually engaged in mining operations (surface shops excluded). This group includes chiefly gold mines in California, Colorado, and Nevada and some copper mines in Michigan. The width of the vein,

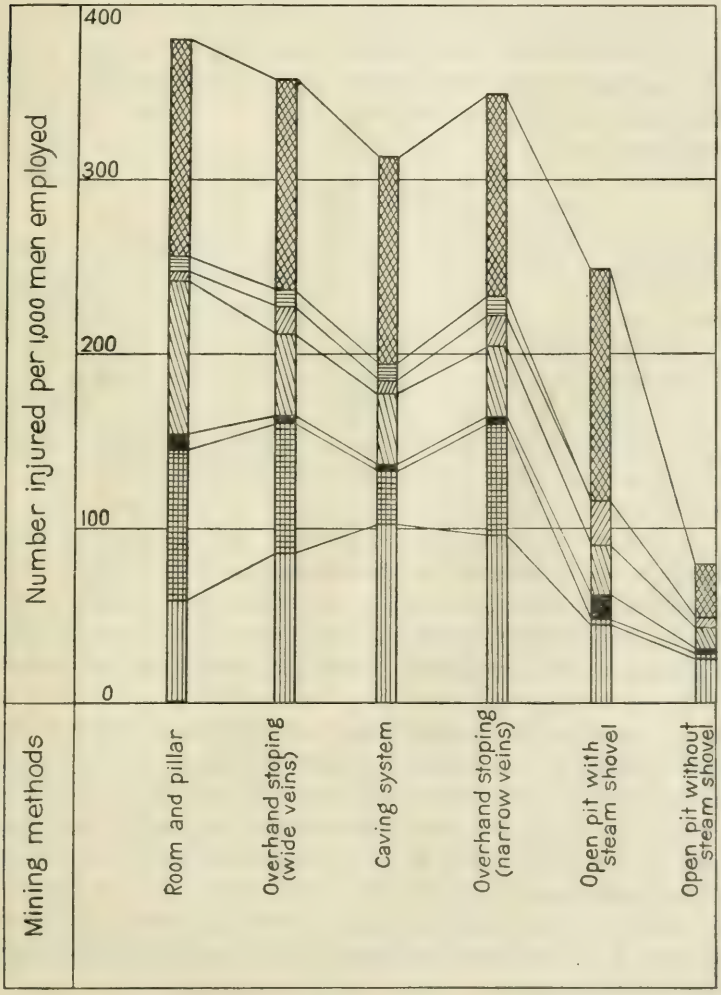

FIGURE 2.—Injury rates compared by causes of accidents and by mining methods.

roughly, is less than 15 or 20 feet. The principal mining method was overhand stoping, a minimum amount of timber being used as stulls and props. Combinations and modifications of overhand stoping with a small amount of underhand stoping, waste filling, cutting and filling, shrinkage, and a few other minor modifications are included.

Of the 64 companies making up this group, there were 4 operating Arizona copper mines, 1 an Arizona gold mine, and 2 Nevada gold mines, all in narrow veins, that reported the use of some filling method. One New Jersey iron mine and one Tennessee copper mine reported underhand stoping. Six of the 64 companies use underhand stoping to some extent in connection with overhand stoping. Eight California gold mines and 3 Nevada gold mines were included which reported overhand stoping, both with and without timber.

Of the number of men employed in this group of mines, 45 were killed, 511 seriously injured, and 2,617 slightly injured, the fatality and injury rates being, respectively, 4.90, 55.68, and 285.17 per 1,000 men employed.

OVERHAND STOPING (WIDE VEINS).

The figures for overhand stoping in wide veins include the returns of 61 companies, representing mines in 14 States and employing 25,981 men (excluding surface shops). The mines included in this group are those in which the ore bodies are wide and massive and in which much timber is used as square sets, drift sets, and cribbing. There are also included mines in which slight modifications of this method, as shrinkage stoping, filling, and some underhand stoping are used. These mines are largely Arizona, Michigan, Montana, and Utah copper mines, with a number of Colorado gold mines and a few gold mines in various other western States. Six of the large Michigan mines reported the use of underhand stoping, especially in opening new ground of uncertain value. Of the total number of men employed, 136 were killed, 1,396 seriously injured, and 7,848 slightly injured, giving fatality and injury rates per 1,000 men employed of 5.23, 53.73, and 302.07.

Overhand stoping has a wide range of application and is used extensively in wide and in narrow ore bodies, with inclinations ranging from 10° to 90° from the horizontal. As regards safety, overhand has some advantages over underhand stoping, as the men always work close to the roof, so that they can easily test it. In underhand stoping the men sometimes work 50 or 75 feet below the roof, so that they can not ascertain its exact condition by sounding. By falling 50 feet, a piece of rock weighing only a few ounces may injure a man.

When overhand stoping is used without timber the men have a secure scaffolding of ore and waste rock on which to work, and the danger of falling through the timbering, as in places where square-set or other timbering is used, is eliminated. Hence the fatality rate from falls of persons is about one-half as great in mines (narrow veins) using little timber as in those working large ore bodies and using a maximum amount of timber.

It is doubtful whether the ore chutes used in working large ore bodies are as well guarded as they should be. Usually the chutes are cribbed to the top of the loose ore or rock, but no vertical timbers protrude above their top, so that conditions for a man falling in are ideal. In square sets the floors are often in poor condition, with plenty of broken and loose plank and unguarded openings through which a man may fall, even if he is cautious in all of his movements.

The hazard due to the use of explosives, however, does not appear to be so great in wide ore bodies, probably because less powder is required to break the ore than in narrow, tight veins.

There is likely, however, to be much drill dust in all overhand stoping, as the men are drilling "uppers." The powdered rock falls directly in front of the miner and is intimately mixed with the air he breathes. In underhand stoping it is an easy matter to keep the holes filled with water and thus allay the dust, whereas with overhand stoping a somewhat complicated mechanical equipment is required to accomplish the same result.

The fatality rate for overhand stoping in large ore bodies where a maximum amount of timber is used is 5.23 per 1,000, as compared with 4.90 in the narrow ore bodies. Although these figures are representative for a single year, not enough data have been collected to warrant drawing reliable conclusions.

ROOM-AND-PILLAR METHOD.

The figures covering mines in which the room-and-pillar method is used represent the returns of 41 mining companies, employing 8,335 men (surface shops excluded). The mines include 22 lead and zinc mines in the Mississippi Valley, 8 iron mines, 5 of which are in Alabama; 6 gold mines, and 5 gypsum mines.

Room-and-pillar mining is especially adapted to sheet-ground deposits, lying approximately flat, and little or no timbering is used other than an occasional prop. The roof is entirely supported by pillars of ore 15 to 25 feet in diameter, left, as a rule, where the roof conditions demand, without regard to regularity. Sometimes the pillars are the poorest ore in the mine and are not recovered, and sometimes, where the ore is of average richness, the pillars are drawn after the rooms have been worked out.

For the successful use of this method of mining a solid back or roof which can be easily supported is required. In the lead mines in southeast Missouri there is a strong limestone capping, which is so self-supporting that about 85 per cent of the workable ore is extracted, leaving only 15 per cent in pillars.

As would be expected, the fatalities and injuries due to falls of persons are much lower for this group of mines than for the two preceding groups in which overhand stoping methods are employed.

Fatalities and injuries due to explosives are much higher, because large faces of ore are exposed and heavy charges of dynamite are used. These flat ore bodies, when mined, leave large open spaces, and the danger from flying pieces of rock and ore from blasts is increased because the men can not get to proper shelter so readily prior to firing shots. As shown in Table 22, the fatality rate due to explosives is higher in this system of mining than in any other, whereas in serious and slight injuries it ranks second. Accidents due to haulage systems and falls of roof are considerably higher than in any other group.

The total fatality rate in the room-and-pillar mines considered is 5.76 per 1,000, as compared with 5.23 for mines stoping large ore bodies and 5.10 for the mines using the caving method.

CAVING SYSTEMS.

The data relating to this system of mining include the returns of 53 companies operating mines in 9 different States and employing 20,177 men. Of the 53 companies represented in this group, 42 operate iron mines in Minnesota and Michigan, 5 operate copper mines in Arizona, and 4 others operate copper mines—the mines being in California, Nevada, New Mexico, and Utah.

Many different names are applied to caving systems, but the principle of all the systems is nearly the same. A certain system may be employed in different States but be known by local names, as, for example, the name of the mine foreman who introduced it at a mine, after having gained his knowledge of it at some iron mine in Michigan or Minnesota. The methods included in this classification include top slicing, substoping, block caving, pillar caving, etc., and the preliminary work that is absolutely necessary for all caving systems.

As would be expected, the fatalities and injuries from explosives are much lower in this group than in any of the others except in open-pit mining without steam shovel. A minimum amount of explosives is used, the weight of the overburden being expected to crush and loosen the ore so that it can be extracted without blasting. The fatality rate for this group of mines is 5.10 per 1,000 men employed, as compared with 5.76 for room and pillar and 5.23 for overhand stoping in wide or large ore bodies. The fatalities due to falls of rock, as indicated in Table 22, are slightly less than in mining by room and pillar and by overhand stoping. The serious and slight injuries, however, are somewhat in excess, owing no doubt to the fact that while a man is shoveling or barring down the ore in a chute his foot or hand may be injured by a piece rolling down. Also the miner often works where there is a large amount of crushed and broken timber, so that he receives many cuts and bruises. Timber and

hand tools are responsible for 18 per cent of the serious injuries and 17 per cent of the slight injuries in the caving systems of mining.

Fatalities due to falls of rock are 2.08 per 1,000 employed (Table 22) as compared with 2.35 in large ore bodies where overhand stoping is used, and 2.64 where the room-and-pillar method prevails. In most cases the rock has not far to drop, which may possibly account for the smaller number of fatalities in this system.

OPEN-PIT MINING WITH STEAM SHOVEL.

The returns from mines that use the open-pit method with steam shovel represent 26 operating companies, employing 9,591 men (surface shops excluded). Of the 26 companies, 15 in Minnesota and 6 in Alabama are iron-mine operators, and 1 each in Nevada, New Mexico, and Utah operates a copper mine, and 1 in Tennessee operates a phosphate mine.

The controlling factors in the choice of this method of mining are the areal extent, elevation with respect to the surrounding country, amount of overburden, and depth to which the deposits extend. The steam shovel may be used in handling massive deposits of a wide range of hardness, although it is best adapted for use with those ores that break into fragments readily. Work at these open-pit mines is conducted on a scale comparable with railroad transportation, inasmuch as the majority of the ore is loaded direct by steam shovel into railroad cars operated by standard locomotives. The accident hazard includes many of the dangers to which railroad employees are exposed.

A large amount of explosives is used, and as shown in Tables 22 and 23, explosives cause about one-third of the fatalities. Serious and slight injuries due to explosives are also higher in this system of mining than in any other, largely because large quantities of explosives are used and blasting is in open air, so that fragments of rock may fly many hundreds of feet. Although a mining company may be doing all it can to guard against injury from the use of explosives, yet there is always the possibility of some one passing near by or, perhaps, working in an obscure place unaware of the warning given previous to the exploding of a large charge of powder or dynamite.

The fatality rate for this group as a whole is approximately one-half as high as in all-underground operations. There seems to be but little difference between the fatality rate in open-pit mines with steam shovel and those without the steam shovel, the rates being 2.50 and 2.28 per 1,000 men employed. The steam-shovel mines were operated 275 days a year as compared with 229 days for the other open-pit mines. The fatality rate adjusted to a 300-day basis becomes

2.73 for steam-shovel mines and 2.98 for open-pit mines not using the steam shovel.

The serious and slight injuries are considerably higher than in the open-pit mines without the steam shovel. This difference is largely due to the machinery about the shovel, to the necessity of adjusting and placing the steam shovel, and to accidents from railroad operations, such as coupling cars, throwing switches, and laying track. The 46 days' excess exposure to the mining hazard should be responsible for nearly 20 per cent of the difference.

OPEN-PIT MINING WITHOUT STEAM SHOVEL.

As regards the open-pit mines without the steam shovel, the returns represent 13 operators employing 2,192 men and include 6 phosphate mines in Florida, South Carolina, and Tennessee; 1 iron mine each in Alabama and Michigan; 1 copper mine each in Alaska and Arizona; and 1 gold mine in California in which much of the ore is mined by the "glory-hole" method.

In the open-pit work without steam shovel the ore is blasted down from the bank, loaded directly into small tram cars, and dumped into bins or railroad cars. This method of working, however, is becoming more or less obsolete and is being supplanted by the use of drag lines or wheel scrapers and, where the deposits are large enough, of steam shovels.

In the matter of safety, the figures given in the accompanying tables (Tables 22 and 23) indicate that the system under consideration is safer than any other system, yet the number of men involved is not large enough to permit the making of a definite statement to this effect. The number of days worked per year is less than in any other group, and hence the exposure is less. The method is, however, more or less comparable with quarry work, figures for which are given in the table following. All of the open-pit work is conducted where there is plenty of light, thus giving the miner an opportunity to see conditions as they exist. Furthermore, the air is good and in most cases there is ample room for the miner to keep out of the way of any falling material.

Number of persons killed and injured per 1,000 employed at quarries in the United States.

Year.	Killed.	Seriously injured.	Slightly injured.
1911	1.69	7.95	40.81
1912	1.88	7.77	49.98
1913	1.72	10.28	62.55
1914	2.05	14.66	74.45
Open-pit mines, without steam shovel, 1914	2.28	13.69	63.87

ACCIDENTS BY CAUSES AND METHODS OF MINING.

Table 22 shows six principal groups of mine accidents as follows: Falls of rock from roof or wall; run or fall of ore while loading at chute, bin, and working place; explosives; haulage; falls of persons; shaft accidents; and miscellaneous. This table also shows the percentage of accidents due to any one cause, these being arranged according to the method of mining. Thus, for example, the falls of rock represent 35.56 per cent of the fatalities in overhand stoping in narrow veins and 44.85 per cent of those in overhand stoping in wide ore bodies. To permit comparison of one method with another, the number of fatalities per 1,000 men employed, classified by system of mining, is given.

Table 23 shows 361 fatalities, 3,899 serious injuries, and 20,407 slight injuries by the causes reported by the operators, the fatalities being grouped according to the six groups of mining systems.

Table 24 shows for 1914 a summary of metal-mine accident figures grouped by methods of mining.

It is hoped that the details presented in the tables mentioned above, by localizing some of the principal hazards of the mining industry, will be of assistance to mine operators in conducting safety campaigns.

TABLE 22.—*Fatalities and injuries classified by principal causes and* ***mining methods*** *(1914).*

NUMBER KILLED.

Method of mining.	Falls of rock. 1 and 31.			By run or fall of ore while loading at chute, bin, or working face. 2, 7, and 37.			Explosives. 4 and 32.			Haulage. 5 and 33.			Falls of persons. 6 and 35.			Miscellaneous. 3, 8, 9, 10, 11, 12, 13, 14, 15, 34, 36, 38, 39, 40, and 41.			Shaft. 16, 17, 18, 19, 20, and 21.			Total.	
	Number.	Per cent of total.	Rate per 1,000 employed.	Number.	Per cent of total.	Rate per 1,000 employed.	Number.	Per cent of total.	Rate per 1,000 employed.	Number.	Per cent of total.	Rate per 1,000 employed.	Number.	Per cent of total.	Rate per 1,000 employed.	Number.	Per cent of total.	Rate per 1,000 employed.	Number.	Per cent of total.	Rate per 1,000 employed.	**Number.**	Rate per 1,000 employed.
Overhand stoping (narrow)	16	35.56	1.74	.....	.....	.....	6	13.33	0.65	1	2.22	0.11	4	8.89	0.44	2	4.44	0.22	16	35.56	1.74	**45**	4.90
Overhand stoping (wide)	61	44.85	2.35	3	2.21	0.12	11	8.09	.42	7	5.15	.27	21	15.44	.81	6	4.41	.23	27	19.85	1.04	**136**	5.23
Room and pillar	22	45.83	2.64	1	2.08	.12	8	16.67	.96	8	16.67	.96	2	4.17	.24	4	8.33	.48	3	6.25	.36	**48**	5.76
Caving	42	40.78	2.08	2	1.94	.10	7	6.80	.35	9	8.74	.44	6	5.82	.30	12	11.65	.59	25	24.27	1.24	**103**	5.10
Open pit, with steam shovel	5	20.84	.52	.....	.....	.....	8	33.33	.83	8	33.33	.83	.....	.....	.....	3	12.50	.32	.....	.....	.....	**24**	2.50
Open pit, without steam shovel	4	80.00	1.82	.....	.....	.....	.....	.....	.....	1	20.00	.46	.....	.....	.....	.....	.....	.....	.....	.....	.....	**5**	2.28
Total	**150**	**41.55**	**1.99**	**6**	**1.66**	**.08**	**40**	**11.08**	**.53**	**34**	**9.42**	**.45**	**33**	**9.14**	**.43**	**27**	**7.48**	**.36**	**71**	**19.67**	**.94**	**361**	**4.78**

NUMBER SERIOUSLY INJURED.

Overhand stoping (narrow)	169	33.07	18.42	64	12.53	6.97	16	3.13	1.74	90	17.61	9.81	30	5.87	3.27	122	23.88	13.29	20	3.91	2.18	**511**	55.68
Overhand stoping (wide)	398	28.51	15.32	262	18.77	10.08	34	2.43	1.31	195	13.97	7.51	72	5.16	2.77	375	26.86	14.43	60	4.30	2.31	**1,396**	53.73
Room and pillar	65	20.12	7.80	43	13.31	5.16	17	5.26	2.04	92	28.48	11.04	11	3.41	1.32	86	26.63	10.32	9	2.79	1.08	**323**	38.75
Caving	361	28.45	17.89	105	8.27	5.20	34	2.68	1.69	231	18.21	11.45	51	4.02	2.53	427	33.65	21.16	60	4.73	2.97	**1,269**	62.89
Open pit, with steam shovel	68	18.38	7.09	.....	.....	.....	30	8.11	3.13	63	17.03	6.57	26	7.02	2.71	183	49.46	19.08	.....	.....	.....	**370**	38.58
Open pit, without steam shovel	9	30.00	4.11	.....	.....	.....	2	6.67	.91	8	26.67	3.65	1	3.33	.46	10	33.33	4.56	.....	.....	.....	**30**	13.69
Total	**1,070**	**27.44**	**14.18**	**474**	**12.16**	**6.28**	**133**	**3.41**	**1.76**	**679**	**17.42**	**9.00**	**191**	**4.90**	**2.53**	**1,203**	**30.85**	**15.94**	**149**	**3.82**	**1.98**	**3,899**	**51.67**

NUMBER SLIGHTLY INJURED.

Overhand stoping (narrow)	701	26.79	76.39	521	19.91	56.77	15	0.57	1.63	263	10.06	28.66	104	3.97	11.33	953	36.41	103.85	60	2.29	6.54	**2,617**	285.17
Overhand stoping (wide)	1,792	22.84	68.97	1,673	21.32	64.39	60	.77	2.31	996	12.69	38.34	350	4.45	13.47	2,827	36.02	108.81	150	1.91	5.77	**7,848**	302.07
Room and pillar	400	14.05	47.99	683	23.98	81.94	53	1.86	6.36	626	21.98	75.10	43	1.51	5.16	971	34.09	116.50	72	2.53	8.64	**2,848**	341.69
Caving	1,684	33.50	83.46	493	9.81	24.44	45	.90	2.23	550	10.94	27.26	92	1.83	4.56	2,023	40.24	100.26	140	2.78	6.94	**5,027**	249.15
Open pit, with steam shovel	357	18.53	37.22	.....	.....	.....	77	4.00	8.03	208	10.79	21.69	212	11.00	22.10	1,073	55.68	111.88	.....	.....	.....	**1,927**	200.92
Open pit, without steam shovel	50	35.72	22.81	3	2.14	1.37	3	2.14	1.37	20	14.29	9.12	10	7.14	4.56	54	38.57	24.64	.....	.....	.....	**140**	63.87
Total	**4,984**	**24.42**	**66.06**	**3,373**	**16.53**	**44.70**	**253**	**1.24**	**3.35**	**2,663**	**13.05**	**35.29**	**811**	**3.97**	**10.75**	**7,901**	**38.72**	**104.72**	**422**	**2.07**	**5.59**	**20,407**	**270.46**

TABLE 23.—*Metal-mine accidents in 1914,*

NUMBER KILLED.

Method of mining.	Underground.									
	Fall of rock or ore from roof or wall.	Rock or ore while loading at working face.	Timber or hand tools.	Explosives.	Haulage accidents.	Falling down chute, winze, raise, or stope.	Run of ore from chute or pocket.	Drilling accidents.	Electricity.	Machinery (not including locomotives or drills).
	1	2	3	4	5	6	7	8	9	10
Overhand stoping (narrow)	16	.....	.....	6	1	4	.....	1	1	.....
Overhand stoping (wide)	61	2	1	11	7	21	1	.....	3	.....
Room and pillar	22	1	1	8	8	2	.....	.....	.....	1
Caving	42	1	.....	7	9	6	1	.....	2	.....
Open pit, with steam shovel	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Open pit, without steam shovel	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	**141**	**4**	**2**	**32**	**25**	**33**	**2**	**1**	**6**	**1**

NUMBER SERIOUSLY INJURED.

Overhand stoping (narrow)	169	54	32	16	90	30	10	32	.....	4
Overhand stoping (wide)	398	220	117	34	195	72	42	61	1	9
Room and pillar	65	42	18	17	92	11	1	27	1	9
Caving	361	78	233	34	231	51	27	29	2	10
Open pit, with steam shovel	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Open pit, without steam shovel	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	**993**	**394**	**400**	**101**	**608**	**164**	**80**	**149**	**4**	**32**

NUMBER SLIGHTLY INJURED.

Overhand stoping (narrow)	701	453	271	15	263	104	68	196	5	14
Overhand stoping (wide)	1,792	1,365	847	60	996	350	308	522	8	50
Room and pillar	400	645	186	53	626	43	38	230	1	36
Caving	1,684	394	875	45	550	92	99	233	25	29
Open pit, with steam shovel	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Open pit, without steam shovel	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	**4,577**	**2,857**	**2,179**	**173**	**2,435**	**589**	**513**	**1,181**	**39**	**129**

by causes, grouped by mining methods.

NUMBER KILLED.

Underground—Continued.						Shaft.						
Mine fires.	Suffocation from natural gases.	Inrush of water.	Stepping on nail.	Other causes.	**Total, underground.**	Falling down shafts.	Objects falling down shafts.	Breaking of cables.	Overwinding.	Skip or cage.	Other causes.	**Total, shaft.**
11	12	13	14	15		16	17	18	19	20	21	
.....	.....	.....	.....	.....	**29**	6	.....	.....	.....	10	.....	**16**
.....	.....	.....	.....	2	**109**	6	3	.....	.....	15	3	**27**
.....	.....	.....	.....	2	**45**	.....	.....	.....	.....	2	1	**3**
2	.....	8	.....	.....	**78**	10	4	.....	.....	6	5	**25**
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2	.....	**8**	.....	**4**	**261**	**22**	**7**	.....	.....	**33**	**9**	**71**

NUMBER SERIOUSLY INJURED.

.....	.....	.....	1	53	**491**	2	3	.....	.....	10	5	**20**
4	.....	.....	1	182	**1,336**	4	14	.....	.....	29	13	**60**
.....	.....	.....	.....	31	**314**	1	2	1	.....	2	3	**9**
.....	3	.....	8	142	**1,209**	8	8	.....	1	24	19	**60**
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	**3**	.....	**10**	**408**	**3,350**	**15**	**27**	**1**	**1**	**65**	**40**	**149**

NUMBER SLIGHTLY INJURED.

.....	3	.....	25	439	**2,557**	5	17	1	.....	22	15	**60**
2	6	.....	68	1,324	**7,698**	10	57	1	.....	51	31	**150**
.....	.....	.....	16	502	**2,776**	2	17	.....	.....	30	23	**72**
.....	3	12	96	750	**4,887**	2	31	.....	1	50	56	**140**
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2	**12**	**12**	**205**	**3,015**	**17,918**	**19**	**122**	**2**	**1**	**153**	**125**	**422**

TABLE 23.—*Metal-mine accidents in 1914,*

NUMBER KILLED.

Method of mining.	Surface (shops and yards).									
	Mine cars, mine locomotives, or aerial trams.	Railway cars and locomotives.	Run or fall of ore in or from ore bins.	Falls of persons.	Stepping on nail.	Hand tools, axes, bars, etc.	Electricity.	Machinery.	Other causes.	Total, surface.
	22	23	24	25	26	27	28	29	30	
Overhand stoping (narrow)										
Overhand stoping (wide)										
Room and pillar										
Caving										
Open pit, with steam shovel										
Open pit, without steam shovel										
Total										

NUMBER SERIOUSLY INJURED.

Overhand stoping (narrow)										
Overhand stoping (wide)										
Room and pillar										
Caving										
Open pit, with steam shovel										
Open pit, without steam shovel										
Total										

NUMBER SLIGHTLY INJURED.

Overhand stoping (narrow)										
Overhand stoping (wide)										
Room and pillar										
Caving										
Open pit, with steam shovel										
Open pit, without steam shovel										
Total										

by causes, grouped by mining methods—Continued.

NUMBER KILLED.

Open pit.												
Falls or slides of rock or ore.	Explosives.	Haulage accidents (locomotives, etc.).	Steam shovels.	Falls of persons.	Falls of derricks, booms, etc.	Run or fall of ore in or from ore bins.	Machinery (other than locomotives or steam shovels).	Electricity.	Hand tools.	Other causes.	Total, open pit.	Grand total.
31	32	33	34	35	36	37	38	39	40	41		1914
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	45
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	136
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	48
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	103
5	8	8	1	.....	.....	.....	2	.....	.....	.....	24	24
4	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	5	5
9	8	9	1	.....	.....	.....	2	.....	.....	.....	29	361

NUMBER SERIOUSLY INJURED.

.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	511
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,396
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	323
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,269
68	30	63	30	26	2	.....	11	2	36	102	370	370
9	2	8	.....	1	.....	.....	3	.....	3	4	30	30
77	32	71	30	27	2	.....	14	2	39	106	400	3,899

NUMBER SLIGHTLY INJURED.

.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,617
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7,848
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,848
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5,027
357	77	208	116	212	2	.....	56	2	205	692	1,927	1,927
50	3	20	.....	10	.....	3	9	.....	14	31	140	140
407	80	228	116	222	2	3	65	2	219	723	2,067	20,407

TABLE 24.—*Summary of metal-mine accident data grouped by methods of mining. (1914.)*

Method of mining.	Number companies represented.	Number States represented.	Days active.	Total days labor.	Number men employed in mines.	Number 300-day workers.	Number killed.			Number seriously injured.			Number slightly injured.		
							Total.	Per 1,000 employed.	Per 1,000 300-day workers.	Total.	Per 1,000 employed.	Per 1,000 300-day workers.	Total.	Per 1,000 employed.	Per 1,000 300-day workers.
Overland stoping (narrow veins)	64	12	316	2,900,270	9,177	9,667	45	4.90	4.66	511	55.68	52.86	2,617	285.17	270.71
Overland stoping (wide ore bodies)	61	14	298	7,733,923	25,981	25,780	136	5.23	5.28	1,396	53.73	54.15	7,848	302.07	304.42
Room and pillar	41	14	301	2,512,415	8,355	8,577	48	5.76	5.73	323	38.75	38.57	2,848	341.69	340.06
Caving	53	9	283	5,715,811	20,177	19,053	103	5.10	5.41	1,269	62.89	66.60	5,027	249.15	263.84
Open pit, with steam shovel	26	7	275	2,639,737	9,591	8,799	24	2.50	2.73	370	38.58	42.05	1,927	200.92	219.00
Open pit, without steam shovel	13	9	229	502,668	2,192	1,675	5	2.28	2.98	30	13.69	17.91	140	63.87	83.58
Total	258		292	22,004,824	75,453	73,349	361	4.78	4.92	3,899	51.67	53.16	20,407	270.46	278.22

FATALITIES AT PLACER MINES.

Tables 25 and 26 following contain the combined reports of 743 operators of placer mines, including dredges, hydraulic mines, and underground gravel mines. At these mines 6,521 men were employed and 15 men were killed, the fatality rate being 2.30 per 1,000 men employed, as compared with 2.25 for 1913 and 2.43 for 1912. The average length of time these mines were operated during the year was 204 days. The placer mines of Alaska worked approximately 180 days, and all other placers 231 days. The average length of time all metal mines (except placers) were operated was 273 days.

Although the fatality rate for placer mines (2.30) is somewhat lower than that for the other metal mines (3.59), yet the length of time the employees were exposed to the mining risk was less. If the number of employees in placer mines be reduced to the 300-day basis, it becomes equivalent to 4,430 men, with a fatality rate of 3.39, as compared with 3.94 for all other mines, not including placer or coal mines. The serious and slight injuries occurring at Alaska placer mines were not included in the Territorial mine inspector's report, hence these details are incomplete in this report, being based on reports received from only a small number of the operators.

Tables 25 and 26 follow.

TABLE 25.—*Accidents in placer mines in the United States during the calendar years 1912, 1913, and 1914.*

Cause of accident.	1912			1913			1914		
	Number killed.	Number seriously injured.	Number slightly injured.	Number killed.[a]	Number seriously injured.	Number slightly injured.	Number killed.	Number seriously injured.	Number slightly injured.
Dredging.									
Machinery	2	11	6	3	14	21	.....	18	70
Electricity	.....	.....	.....	2	.....	1	2	.....	2
Boiler explosions or bursting steam pipes	.....	.....	1	.....	.....	.....	.....	.....	.....
Falls of persons	.....	1	7	.....	5	13	2	6	14
Tools	.....	5	22	.....	6	19	.....	8	71
Other causes	2	3	15	2	22	33	1	3	34
Total number killed or injured by dredging accidents	4	20	51	7	47	87	5	35	191
Hydraulicking.									
Cave of bank	2	.....	3	.....	1	4	.....	1	3
Explosives	1	.....	.....	.....	.....	1	1	1	.....
Hydraulic giants	1	1	1	.....	.....	.....	.....	1	1
Falls of persons	.....	1	4	.....	2	1	.....	2	3
Rock while handling	.....	.....	7	.....	3	4	.....	.....	4
Tools	.....	.....	4	.....	.....	1	.....	.....	3
Machinery, derricks, etc	.....	1	.....	1	2	.....	.....	.....	6
Other causes	.....	.....	4	.....	.....	1	1	3	3
Total number killed or injured by hydraulicking accidents	4	3	23	1	8	12	2	8	23
Underground.									
Fall of roof or gravel	.....	.....	5	5	5	4	2	2	7
Timber or hand tools	.....	.....	3	1	.....	3	.....	1	3
Explosives	.....	.....	1	.....	.....	.....	1	.....	1
Falls of persons	.....	.....	.....	1	1	.....	1	1	1
Haulage	.....	.....	1	.....	.....	.....	.....	.....	.....
Drilling	.....	.....	1	.....	.....	1	.....	.....	2
Hoisting	.....	.....	1	.....	1	.....	2	.....	.....
Steam (when steam points are used)	.....	.....	.....	.....	.....	.....	.....	.....	.....
Other causes	.....	.....	.....	.....	2	.....	2	.....	.....
Total number killed or injured by underground accidents	.....	.....	12	7	9	8	8	4	14
Grand total	8	23	86	15	64	107	15	47	228

[a] Includes fatalities in Alaska placers. The fatalities for 1912 and the serious and slight injuries for 1912, 1913, and 1914 are not included in this report.

TABLE 26.—*Number of men employed, number killed, and days worked in* **placer** *mines in the United States during the calendar year 1914.*

State.	Number of active operators.	Number of employees.	Days' work performed.	Average number of days worked.	Number of men killed.																										Grand total.
					Dredging.							Hydraulicking.								Underground.												
					By machinery.	By electricity.	By boiler explosions or bursting steam pipes.	By falls of persons.	By tools.	By other causes.	Total.	By cave of bank.	By explosives.	By hydraulic giants.	By falls of persons.	By rock while handling.	By tools.	By machinery, derricks, etc.	By other causes.	Total.	By fall of roof or gravel.	By timber or hand tools.	By explosives.	By falls of persons.	By haulage.	By drilling.	By hoisting.	By steam (when steam points are used).	By other causes.	Total.		
	1	2	3	4	5	6		7	8	9	10	11	12	13	14		15	16	17	18	19	20	21	22	23			
Alaska [a]	250	3,500	630,000	180						1	1									1			1			2		1	5	6
Arizona	3	14	4,443	317																											
California	224	1,852	513,181	277				1			1		1						1	2	1		1							2	5
Colorado	7	45	8,440	188																											
Idaho	92	368	53,404	145				1			1																				1
Montana	45	217	46,472	214		2					2																				2
Nevada	19	128	26,264	205																								1	1		1
New Mexico	4	22	885	40																											
Oregon	80	323	39,527	122																											
Washington	5	15	1,025	68																											
Wyoming	8	23	3,930	171																											
Other States	6	14	1,533	110																											
Total, 1914	**743**	**6,521**	**1,329,104**	**204**		**2**		**2**		**1**	**5**		**1**					**1**	**2**	**2**		**1**	**1**		**2**		**2**	**8**	**15**
Total, 1913	745	6,680	1,329,033	199	3	2				2	7						1		1	5	1		1					2	7	15
Total, 1912 [b]	459	3,289	849,091	258	2					2	4	2	1	1					4											8

[a] Reported by Sumner S. Smith, United States mine inspector, Juneau, Alaska.
[b] Does not include Alaska.

METAL-MINE, COAL-MINE, AND QUARRY ACCIDENTS COMPARED.

Comparative data for metal mines, coal mines, and quarries of the United States during 1913 and 1914 are shown in the table on page 78. The majority of the coal-mining States have systematic coal-mine inspection, which tends to reduce the accidents; whereas many of the metal-mining States have no inspection service.

On account of the great disasters that occur in coal mines and the prominence given to them by the newspapers, coal mining is usually considered much more hazardous than metal mining.

As the figures show, metal mines usually do not claim their death toll in disasters that involve many men, most of the men who die from accidents being killed one at a time. Altogether, there were reported in the metal mines in 1914, 32 accidents in which 2 or more men were killed at one time, making the total thus killed 81, or 14.5 per cent of all the fatalities, as compared with 11.6 per cent in 1913, 12.3 per cent in 1912, and 19.5 per cent in 1911.

Although the fatality rate in metal mines during 1914 was 3.54 per 1,000 men employed, and in coal mines 3.22, yet the comparison is not absolutely fair, for the reason that the metal miners worked 271 days as compared with 207 days for the coal miners. Thus the men in the metal mines were exposed to the mining risk 64 days longer than were the coal miners. If both rates be reduced to the 300-day basis, the metal-mine fatality rate becomes 3.92 per 1,000 300-day workers in comparison with 4.67 for the coal mines and 2.64 for quarries.

Percentages of men killed by various causes, also the number employed and the number killed, in metal mines, coal mines, and quarries in the United States are shown in the following tabulations.

Percentage of persons killed by different causes in and about ***metal mines, coal mines,*** *and* ***quarries*** *in the United States during 1911, 1912, 1913, and 1914.*

Kind of mine.	Cause of death.								
	Falls of overburden, roof, quarry material, ore, or coal.	Explosives.	Haulage and handling rock, ore, or coal.	Falls of person.	Electricity.	Machinery.	Gas and dust explosions.	Other causes.	Total.
1911:									
Metal mines	**32.52**	**11.23**	**7.63**	**15.39**	**2.45**	**3.16**	.....	**27.62**	**100.00**
Coal mines	48.58	4.93	17.54	1.54	3.46	1.77	13.94	8.24	100.00
Quarries	25.53	26.60	20.21	8.51	1.06	9.04	.....	9.05	100.00
1912:									
Metal mines	**34.82**	**14.21**	**9.99**	**13.91**	**3.78**	**3.78**	.....	**19.51**	**100.00**
Coal mines	48.77	5.64	19.11	1.19	3.60	1.86	12.75	7.08	100.00
Quarries	23.94	22.07	22.07	9.39	1.88	10.80	.....	9.85	100.00
1913:									
Metal mines	**36.16**	**13.04**	**11.42**	**12.31**	**3.80**	**3.94**	.....	**19.33**	**100.00**
Coal mines	45.39	4.96	18.63	1.80	3.16	1.79	18.46	5.81	100.00
Quarries	20.76	24.04	18.04	9.29	2.73	10.92	.....	14.22	100.00
1914:									
Metal mines	**37.56**	**10.73**	**8.96**	**16.11**	**3.04**	**2.51**	.....	**21.09**	**100.00**
Coal mines	46.09	5.95	18.78	2.85	4.08	2.08	14.22	5.95	100.00
Quarries	29.45	19.44	17.22	12.78	1.67	6.67	.....	12.77	100.00

Number of men employed and number of men killed in and about all mines and quarries in the United States during 1911, 1912, 1913, and 1914.

Year.	Metal mines.			Coal mines.		
	Number employed.	Number killed.		Number employed.	Number killed.	
		Total.	Per 1,000 employed.		Total.	Per 1,000 employed.
1911	165,979	695	4.19	728,348	2,656	3.65
1912	169,199	661	3.91	722,662	2,419	3.35
1913	191,276	683	3.57	747,644	2,785	3.73
1914	**158,115**	**559**	**3.54**	**763,185**	**2,454**	**3.22**
Average for 4 years	**171,143**	**650**	**3.80**	**740,460**	**2,578**	**3.48**

Year.	Quarries.			Total, mines and quarries.		
	Number employed.	Number killed.		Number employed.	Number killed.	
		Total.	Per 1,000 employed.		Total.	Per 1,000 employed.
1911	110,954	188	1.69	1,005,281	3,539	3.52
1912	113,105	213	1.88	1,004,966	3,293	3.28
1913	106,278	183	1.72	1,045,198	3,651	3.49
1914	**87,936**	**180**	**2.05**	**1,009,236**	**3,193**	**3.16**
Average for 4 years	**104,568**	**191**	**1.83**	**1,016,171**	**3,419**	**3.36**

METAL-MINE ACCIDENTS IN FOREIGN COUNTRIES.

Table 18 has been compiled from official reports of representative foreign countries in which mining is an important industry. The table shows the number of men employed in and about metal mines, the number killed, and the rate of fatalities per 1,000 men employed. It will be noted that the fatality rates are lower than those of metal mines in the United States. One reason for the difference is that for many years rigid inspection has been enforced in most of the important foreign mining countries. In the older nations, as Great Britain, Germany, and France, the majority of the miners have worked about mines from childhood, as did their fathers and grandfathers before them. Another reason is that in these countries the majority of the miners speak a common language, and there is comparatively little misunderstanding of orders given by mine officials.

In the United States it is not uncommon to find at a large mine men representing 10 or even 20 nationalities, a very large percentage of whom can not speak English nor understand another language than their own. An Italian and a Swede may work side by side in a mine under a shift boss who gives his orders in English, a language not understood by either of the two men. In case an accident happens the survivor testifies through an interpreter before the coroner's jury that he thought the orders of the shift boss—not at all what they actually were—were "so and so." A common language is essential to safety in mining.

NONFATAL ACCIDENTS CLASSIFIED BY PARTS OF BODY INJURED.

Table 27 was compiled from a number of the State mine inspectors' reports in which details were published relating to the more serious nonfatal injuries. This table represents 1,408 nonfatal injuries at mines in various parts of the United States, and while not complete is sufficiently representative to furnish some data that may be useful to hospitals and first-aid departments in choosing their surgical equipment. The table shows the injuries classified by causes, and at the same time shows the part of the body injured. (See also figure 3.)

TABLE 27.—*Nonfatal injuries, by causes, showing parts of body injured, in and about metal mines in the United States (partial list only).*

Part of body injured.	Cause of injuries.																			
	Fall of rock or ore from roof or wall.	Rock or ore while loading at working face or chute.	Timber or hand tools.	Explosives.	Haulage accidents.	Falling down shaft, chute, winze, raise, or stope.	Run of ore from chute or pocket.	Drilling accident.	Electricity.	Machinery.	Mine fires.	Nails and splinters.	Falling objects.	Cage, skip, or bucket.	Strains while lifting.	Running into or against objects.	Explosion of gasoline, oil, or carbide.	Falls of persons.	Flying objects (not from explosives).	Total.
Head or face injured	34		6	13	5	4	1	1		1			2	2				9		78
Skull fractured	12		1	3		5				2				1				1		25
Eye injured	3	1	2	3		1		5					1			1		1	15	33
lost				10				1												11
Eyes injured				4		1		2												7
lost				3																3
Nose broken														1						1
Jaw broken				1						2				1						4
Collar bone broken	1				4									1				1		7
Arm injured	11	1	4	1	6			1					1					2		27
broken	12	1	5	2	3	1				4			2	2				3		35
lost										2										2
Arms injured				1									1					1		3
broken										1										1
lost																				
Wrist injured	8		2		6			1					1			1		1		20
broken	1		2		2															5
Hand injured	28		17	2	10	1	2	2		4		3	2	2				2		75
burned				1					1								7			9
broken	3				1		1													5
lost																				
Hands injured				1																1
broken																				
lost																				
Thumb injured	9	1	12		4			2		2		2							1	33
broken	1												1							2
lost	1			1	2		1													5
Finger injured	30	1	18		20	1	3	5		10		3	1	1				3		99
broken	4	1	3		10		1						1	2						22
lost	4		3	1	8					5			1	1						23
Fingers injured	11		7		22		3	2		3				1						49
broken	2		1		2									1						6
lost				1	6					3				1						11

Shoulder injured	10		4		2	3		1	1	1								5		27
broken	2			1	1									1				1		6
Body injured	16	1	2	10	16	5				2			3	6	3			11	1	76
burned											3									3
Rib broken	8		2	1	4					1			2			4		9		31
Ribs broken	2		4	1	3	2		2										7		21
Back injured	47	1	4	2	12	4				1			1	6	9			11		98
broken	6																			6
Hip injured	6			1	2		1											4		14
broken	1				1	1														3
Leg injured	19	3	5	1	8	1	1	1					1	2				4		46
broken	103	3	12	6	15	9	7			3			3	5				12		178
lost	3		1		2					1										7
Legs injured	2					2	1													5
broken							1							1				1		3
lost																				
Knee injured	12	1	3		4		1			2						2		7		32
Foot injured	31	6	17	1	8		1	1		1		5	4	1						76
broken	8	1	3		5					2			1	2				1		23
lost	1			1	2															4
Feet injured																		1		1
broken																				
lost																				
Ankle injured	15	1	4		8	1	1						2	1		1		5		39
broken	8		1			1							1	1				2		14
Ankles injured																				
broken																		2		2
Toe injured	12	4	6		5			1		2			8							38
broken	8		6		3		1						2							20
lost	2																			2
Toes injured	8		1		5					1										15
broken	2																			2
lost					2															2
Internal injuries	2			2						1										5
Rupture (hernia)															6			1		7
Total	509	30	158	75	219	43	27	28	2	57	3	13	42	43	18	9	7	108	17	1,408

Figure 3 shows the percentage of the accidents affecting certain parts of the body, as head, face, arms, etc. It will be noted that 19 per cent of the accidents result in injuries to the legs, 17 per cent in injuries to the feet, and 24 per cent in injuries to the hands.

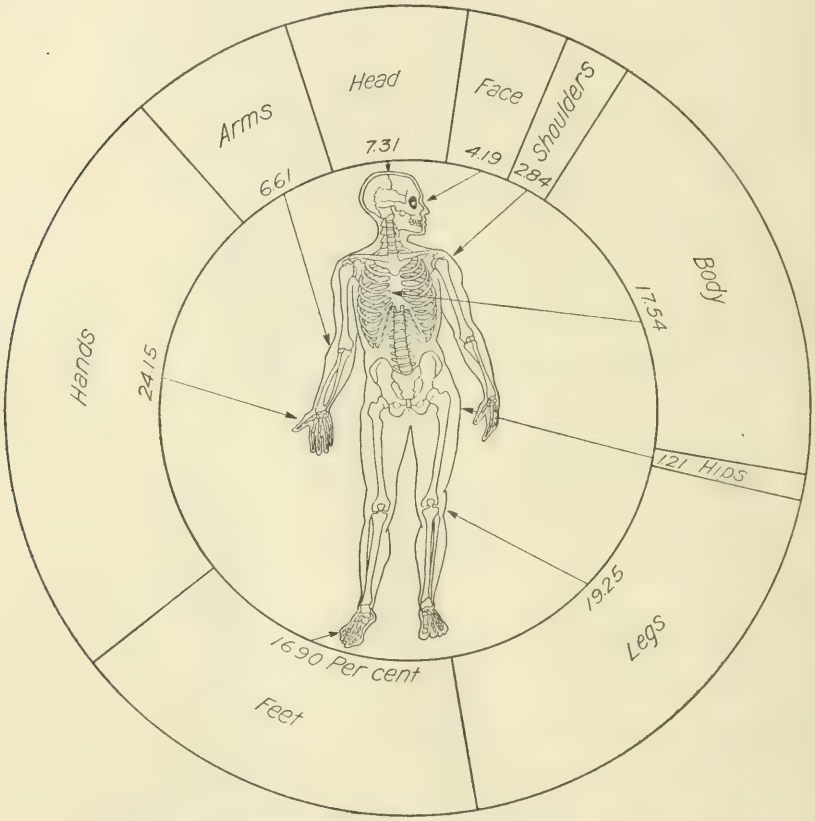

FIGURE 3.—Nonfatal injuries classified according to part of body affected.

ACCIDENTS AT METALLURGICAL WORKS.

The data presented on the preceding pages are for mining operations only and in no way are intended to include accidents at ore-dressing plants and smelters. The Bureau of Mines has collected data showing the number of men employed and the number of accidents at ore-dressing plants and smelters for the calendar years 1913 and 1914, summaries of which are given in tables following. The number of men employed at ore-dressing plants in 1914 was 14,501 and at smelters 26,960. The fatality rates at the metallurgical plants are considerably lower than in the mining industry. The serious injuries at ore-dressing and smelting plants are also less than

at the mines, while the slight injuries at smelters are slightly in excess of those reported for the mining industry as a whole.

Tables 28, 29, and 30, giving statistics covering metallurgical works, follow.

TABLE 28.—*Summary of accidents at* ***ore-dressing plants*** *in the United States, 1913 and 1914.*[a]

	Killed.		Seriously injured.		Slightly injured.	
	1913	1914	1913	1914	1913	1914
Accidents by causes:						
Haulage system (cars, motors, etc.)	1	.....	19	19	79	60
Railway cars or locomotives	1	3	10	3	24	35
Crushers	.....	.....	6	6	27	17
Rolls or stamps	.....	2	7	8	24	33
Tables, jigs, etc	.....	.....	14	10	51	36
Other machinery	2	6	61	41	158	129
Falls of persons	3	3	51	34	187	171
Suffocation in ore bins	1	2	.....	.....	.....	2
Falling objects (rocks, timbers, etc.)	3	3	51	21	316	201
Cyanide or other poisoning	1	.....	1	1	7	8
Scalding (steam or water)	.....	.....	4	1	20	8
Electricity	1	2	5	4	16	26
Hand tools	.....	.....	14	14	185	119
Nails, splinters, etc	.....	.....	1	5	73	73
Flying pieces of rock from sledging or crusher	.....	.....	4	9	128	41
Other causes	3	2	59	47	375	252
Total number killed or injured	**16**	**23**	**307**	**223**	**1,670**	**1,211**
Accidents by States:						
Alabama	0	0	1	0	15	1
Alaska	(b)	1	(b)	3	(b)	27
Arizona	4	5	64	58	271	229
California	0	1	7	17	29	94
Colorado	5	2	30	17	97	86
Idaho	1	1	7	5	23	14
Illinois	0	0	1	2	33	1
Michigan	0	1	8	25	17	26
Missouri	1	2	11	12	198	168
Montana	1	4	23	20	166	101
Nevada	0	2	19	18	64	65
New Jersey	0	0	4	5	25	22
New Mexico	1	0	7	8	104	87
New York	0	0	0	4	0	8
Oklahoma	0	0	3	4	8	31
Oregon	0	0	0	1	3	4
South Dakota	0	0	5	4	29	6
Tennessee	0	0	2	0	11	1
Texas	0	0	0	1	0	6
Utah	2	4	97	16	434	195
Virginia	0	0	2	1	18	4
Washington	0	0	0	0	0	0
Wisconsin	0	0	3	0	65	16
Other States	1	0	13	2	60	19
Total number killed or injured	**16**	**23**	**307**	**223**	**1,670**	**1,211**
Number killed or injured per 1,000 employed	1.07	1.59	20.49	15.38	111.44	83.51

[a] Fay, A. H., Accidents at metallurgical works in the United States, 1913 and 1914: Tech. Paper 124, Bureau of Mines, 1915, p. 11.
[b] No report rendered.

TABLE 29. *Summary of accidents at* ***smelting plants*** *in the United States, 1913 and 1914.*[a]

	Killed.		Seriously injured.		Slightly injured.	
	1913	1914	1913	1914	1913	1914
Accidents by causes:						
Haulage system (cars, motors, etc.)	5	3	80	110	306	385
Railway cars or locomotives	5	7	21	34	54	77
Crushers	.....	.....	7	6	12	7
Cranes	4	.....	18	17	50	38
Blowers	.....	.....	.....	.....	2	3
Other machinery	8	3	45	66	187	168
Falls o persons	10	6	95	147	269	473
Suffocation in ore bins	1	2	3	1	10	.....
Flying or falling objects (rocks, timbers, etc.)	3	1	102	157	501	895
Gas (burning or asphyxiation)	.....	.....	2	3	16	56
Scalding (steam or water)	.....	1	11	21	34	41
Electricity	2	2	4	6	53	43
Hand tools	.....	.....	44	77	379	509
Nails, splinters, etc	.....	.....	2	3	77	93
Furnace slips	.....	.....	2	2	15	6
Burns from matte, slag, or molten metal (pouring or spilling)	4	2	174	191	603	768
Hot-metal explosions	2	.....	28	43	120	119
Other causes	3	6	102	131	819	977
Total number killed or injured	**47**	**33**	**740**	**1,015**	**3,507**	**4,658**
Accidents by States:						
Arizona	15	3	187	136	618	417
California	2	1	88	44	56	119
Colorado	1	2	57	126	238	510
Illinois	2	3	46	73	225	624
Kansas	0	0	11	11	52	78
Missouri	0	0	20	20	333	237
Montana	4	6	37	62	353	476
Nevada	5	1	17	8	111	25
New Jersey	2	3	28	131	172	491
New York	1	1	0	3	15	46
Oklahoma	3	1	23	14	98	83
Pennsylvania	0	1	19	9	232	196
Tennessee	0	1	29	51	343	275
Utah	10	5	95	161	459	444
West Virginia	1	0	7	14	79	47
Other States	1	5	76	152	123	590
Total number killed or injured	**47**	**33**	**740**	**1,015**	**3,507**	**4,658**
Number killed or injured per 1,000 employed	2.29	1.22	35.99	37.65	170.54	172.77

[a] Fay, A. H., Accidents at metallurgical works in the United States, 1913 and 1914, Tech. Paper 124, Bureau of Mines, 1915, p. 10.

TABLE 30.—*Number of men employed and average number of days worked at* ***metallurgical plants*** *(excluding iron blast furnaces) in the United States during the calendar years 1913 and 1914.*[a]

State.	Smelting plants.				Ore-dressing plants.			
	1913		1914		1913		1914	
	Number of employees.	Average days worked.	Number of employees.	Average days worked.	Number of employees.	Average days worked.	Number of employees.	Average days worked.
Alabama					130	240	100	173
Alaska							225	338
Arizona	2,979	357	2,491	351	1,321	347	1,314	333
Arkansas							(b)	
California	1,093	322	917	343	668	290	581	264
Colorado	2,734	362	2,810	358	785	331	960	305
Georgia					(b)		(b)	
Idaho					372	282	441	264
Illinois	1,946	358	3,228	362	178	252	164	221
Indiana	(b)		(b)					
Iowa							(b)	
Kansas	800	336	942	359	(b)		(b)	
Massachusetts					(b)		(b)	
Michigan	(b)		(b)		756	201	1,761	280
Minnesota					(b)		(b)	
Missouri	1,096	358	980	360	1,657	295	1,466	274
Montana	1,224	365	1,589	319	2,527	358	1,082	298
Nebraska			(b)					
Nevada	840	362	726	348	1,444	353	1,396	328
New Jersey	757	364	3,567	340	383	301	440	308
New Mexico	(b)				694	364	741	318
New York	110	323	210	307			145	215
North Carolina					(b)		(b)	
Ohio	(b)		(b)					
Oklahoma	1,181	365	1,210	351	254	330	404	293
Oregon	(b)				40	276	142	239
Pennsylvania	1,527	360	1,279	354	(b)			
South Carolina							(b)	
South Dakota	(b)				360	326	358	361
Tennessee	460	358	299	352	218	238	87	312
Texas	(b)		(b)		72	263	57	324
Utah	1,609	365	2,779	365	2,329	361	2,054	350
Virginia	(b)		(b)		174	333	100	243
Washington	(b)		(b)		28	34	18	196
West Virginia	919	359	826	356				
Wisconsin			(b)		197	272	175	226
Wyoming							(b)	
Other States	1,289	314	3,107	332	398	237	290	178
Total	**20,564**		**26,960**		**14,985**		**14,501**	
Average		**355**		**349**		**323**		**302**

[a] Fay, A. H., Loc. cit.

[b] Included in "Other States."

WHO IS TO BLAME FOR MINE ACCIDENTS?

In every industry a certain percentage of the accidents is incident to the hazards of the industry, and for these no responsibility is to be placed either on the management or on the injured persons. Just what this percentage is in the mining industry is not definitely known, but figures compiled from the records of the Department of Mines of the Union of South Africa indicate that about one-half of the fatalities at mines are due to the hazard of the industry, that is, "danger inherent to work or misadventure." Of the remaining accidents, the responsibility for a certain percentage can be placed on the miner and the management.

The actual responsibility for a mine accident is often a delicate question and the answer depends largely on the person making the report. There is a natural tendency to shirk responsibility and to throw the blame on the other party whenever possible. It is difficult to obtain an unbiased report on accidents unless they are investigated by some disinterested person, and this is not always done. There is carelessness of both the miner and the management. Little information is available showing to what extent the personal character or tendency of the miner and his coworker, the mine foreman, or the superintendent and others in authority, enters into the causes of accidents. Many accidents are due to the inexperience of the miner, his failure to heed orders, a misunderstanding of instructions, and, last but not least, carelessness of himself or fellow workers. A foreman or superintendent may fail to give proper warning regarding the conditions of certain parts of the mine; he may not have inspected certain stopes, rooms, or entries on the day of an accident; the mine may not be properly equipped, or the operator may neglect to comply with the inspector's recommendations. Evidently, there is a personal equation of both the operator and the miner which must be considered.

Since 1911 the Government inspectors of the Department of Mines of the Union of South Africa, after investigating all fatal accidents, have tabulated the results, placing the responsibility in seven groups, as shown in Table 31 following. This tabulation represents 2,497 fatalities, and should be thoroughly representative of the mining industry, as it includes more than 200,000 employees for a period of 2½ years. They represent the Transvaal, Cape Colony, Orange Free State, and Natal mines.

The first group shown by the South African inspectors places 56.03 per cent of the fatalities as inherent in the work or to misadventure. Those fatalities that might be attributed to the mining company are stated as follows: Defective plant or material, fault of management, and fault of foreman. The summary of data covering these three shows that the operator was responsible for 17.50 per cent of the fatalities during the period covered. Of the fatal accidents, the statistics show that the injured person was responsible for 17.10 per cent as due to carelessness, ignorance, and disobedience of orders. This figure is practically the same as that representing fatalities chargeable to the management. In addition to the fault of the injured person, there is also the fault of others, which in the South African reports includes those accidents due to a fellow workman's carelessness, ignorance, and disobedience of orders, representing 5.93 per cent. Combining these two would place upon the miner and his associates 23.03 per cent, while the management was responsible for 17.50 per cent. Table 31 follows:

TABLE 31.—*Responsibility for fatal accidents in the Union of South Africa.*

Cause.	1911. (July 1 to Dec. 31).		1912.		1913.		Summary.	
	Number killed.		Number killed.		Number killed.		Number killed.	
	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.
1. Danger inherent to work or misadventure	303	58.49	524	53.09	572	57.66	1,399	56.03
2. Defective plant or material.	10	1.93	47	4.76	41	4.13	98	3.93
3. Fault of injured person:								
Carelessness	64	12.35	86	8.71	54	5.44	204	8.17
Ignorance	10	1.93	25	2.53	21	2.12	56	2.24
Disobedience of order	41	7.92	73	7.40	53	5.34	167	6.69
4. Fault of management	8	1.54	11	1.11	37	3.73	56	2.24
5. Fault of gangers (foremen).	41	7.92	124	12.57	118	11.90	283	11.33
6. Fault of others	26	5.02	59	5.98	63	6.35	148	5.93
7. Joint fault of 3, 4, 5, 6	15	2.90	38	3.85	33	3.33	86	3.44
Total	**518**	**100.00**	**987**	**100.00**	**992**	**100.00**	**2,497**	**100.00**

THE BURDEN OF RESPONSIBILITY.

The figures as cited herein represent the mining industry of South Africa, where a large majority of the miners are Kaffirs and where it would be an easy matter for the inspector to shift the burden of responsibility onto the miner. The Kaffirs in their native land are not miners, and have absolutely no knowledge of machinery, electricity, or explosives when they begin work in the mines; yet, these figures show that less than one-fourth of the fatal accidents are due to the carelessness and the ignorance of these uneducated laborers. Although seemingly it would not have been difficult to shift the burden of the responsibility on to the Kaffir, the figures quoted show the responsibility of the miner to be about equal to that of the operator, and represent the unbiased result of the inspector's work. If these figures be taken as a standard, the percentage of accidents due to these causes should be less in the majority of the mines in the United States, especially in those mines where English-speaking labor is employed. Where there is an excess of inexperienced laborers that do not speak English, it would seem that conditions similar to those in mines in South Africa should prevail.

Although the South African figures show that the mining company is responsible for 17.50 per cent, and the miners for 23.03 per cent, of the fatal injuries, yet the personal influence exerted by mining companies whose officials are careful and enforce strict rules and regulations should have a salutary effect on the miners in inducing them to be more careful. Lax management will necessarily have a tendency to breed carelessness among employees.

Legislation and the enactment of compensation laws, by making fatalities and injuries costly, necessarily will make the operator realize the seriousness of the mine-accident situation. The miner must be educated and made to realize the dangers he encounters; he

must learn that self-preservation and the safety of his fellow workmen should receive his first attention; he should cooperate with his employer, his associates, and the State mine inspector to the end that the mine hazard may be reduced to a minimum. "Cooperation for safety" should be the watchwords of the miner, operator, State inspectors, and all others in any way interested in the mining industry.

FORM FOR MINE-ACCIDENT RECORDS, 1916.

As a result of the work already done by the Bureau of Mines in collecting accident statistics, the obtaining of more information regarding the various kinds of accidents has been found desirable. For example, the explosives accidents have all been reported under one item as "Accidents due to explosives," but the safety engineer, the mine superintendent, and others in authority, who are making a study of mine accidents, feel that there should be more detailed information concerning such accidents. Thus, "Accidents due to explosives" have included accidents due to transportation, premature shots, thawing explosives, etc.; but if many explosives accidents are due to some one cause, this cause should be brought to the attention of the safety engineer. To assemble all explosives accidents in one group makes it impossible to determine just where the principal hazard lies. The same is true of accidents due to electricity and haulage.

In order that more detailed information may be had, the bureau presents herewith a form (Pl. I) for recording accidents at mines and metallurgical works, in the hope that many of the mining companies will consider its adoption. Should the companies do so, a long step will be taken toward the unification of accident records in different parts of the country. This form, therefore, is presented with two objects in view: First, that more detailed information on different kinds of accidents may be obtained; and, second, that the adoption of the form will help to standardize the records.

The form herein submitted shows how the daily record would appear, giving the man's name and the date of the accident, and simply a check mark under the cause of the accident. At the end of the form the accident would be classified as causing a fatality, permanent or temporary disability, or a slight injury. The time lost due to disability may also be inserted. There will be ample room under "Remarks," if further information is desirable, to show what the man was doing at the time of the accident, etc.

The calculation of fatality rates on the number of men employed is not as accurate as it should be, for the reason that many of the men do not work full time, so that the number of men on the pay roll is too high. Rates should be based on the number of full-time men actually exposed to the dangers of the mine. This rate can be obtained only by recording the actual number of hours worked during

Record of accidents at the Czar mine of the Arizmo Mining Co.

Underground. — Mine workings.

Name of injured person.	Date of accident.	Falls of rock or ore from roof or wall. (1)	Handling rock or ore: (a) Loading at face. (2)	(b) Loading at chute.	(c) Sledging.	Timber or hand tools. (3)	Explosives: (a) Transportation. (4)	(b) Charging.	(c) Suffocation.	(d) Drilling into old holes.	(e) Striking in loose rock or ore.	(f) Thawing.	(g) Caps, detonators, etc.	(h) Unguarded shots.	(i) Returned too soon.	(j) Premature shot.	(k) Miscellaneous.
	1916.																
Joe Brown	Aug. 5																
R. V. Adams	10																
J. C. Clark	25	1															

Name of injured person.	Haulage: (a) Hand and animal. (5)	(b) Mechanical.	Persons falling down chutes, winze, raise, or stope. (6)	Run of ore from chute or pocket. (7)	Drilling (by machine or hand drills). (8)	Electricity: (a) Direct contact with trolley wire. (9)	(b) Tool or bar striking trolley wire.	(c) Contact with motor.	(d) Others.	Machinery other than 5 and 8. (10)	Mine fires. (11)	Suffocation from natural gases. (12)	Inrush of water. (13)	Nails and splinters. (14)	Other causes: (a) Falling objects, other than 1 and 2. (15)	(b) Flying objects, other than 2c.	(c) Burns.	(d) Miscellaneous.
Joe Brown		1																
R. V. Adams										1								
J. C. Clark																		

Shaft.

Name of injured person.	Falling down shaft. (16)	Objects falling down shafts. (17)	Breaking of cables. (18)	Overwinding. (19)	Cage, skip, or bucket: (a) Runaway. (20)	(b) Riding with rock or ore.	(c) Riding with timber or tools.	(d) Struck by.	Other causes. (21)
Joe Brown									
R. V. Adams									
J. C. Clark									

Surface shops and plants (except mills and smelters).

Name of injured person.	Haulage: (a) Hand and animal. (22)	(b) Mechanical.	Railway cars and locomotives. (23)	Run or fall of ore in or from ore bins. (24)	Falls of persons. (25)	Nails and splinters. (26)	Hand tools, axes, bars, etc. (27)	Electricity: (a) Direct contact with trolley wire. (28)	(b) Tool or bar striking trolley wire.	(c) Contact with motor.	(d) Others.	Machinery. (29)	Other causes: (a) Falling objects. ([illegible])	(b) Flying objects.	(c) Burns.	(d) Miscellaneous.	[illegible] ([illegible])	[illegible] ([illegible])
Joe Brown																		
R. V. Adams																		
J. C. Clark																		

Record of accidents at metallurgical plants of the Arizmo Mining Co.

Ore-dressing and milling accidents.[3]

Name of injured person.	Date of accident.	Haulage system: (a) Hand and animal. (1)	(b) Cars and motors.	(c) Mechanical conveyors.	Railways cars and locomotives. (2)	Crushers. (3)	Rolls or stamps. (4)	Tables, jigs, etc. (5)	Other machinery. (6)	Falls of persons. (7)	Suffocation in ore bins. (8)	Falling objects (rocks, timbers, etc.). (9)	Cyanide or other poisoning. (10)	Scalding (steam or water). (11)	Electricity. (12)	Hand tools, axes, bars, etc. (13)	Nails, splinters, etc. (14)	Flying pieces of rock from sledging or crusher. (15)	Other causes. (16)

Smelter accidents.[4]

Haulage system (cars, motors, etc.): (a) Hand and animal. (1)	(b) Cars and motors.	(c) Mechanical conveyors.	Railway cars and locomotives. (2)	Crushers. (3)	Cranes. (4)	Blowers. (5)	Other machinery. (6)	Falls of persons. (7)	Suffocation in ore bins. (8)	Flying or falling objects (rocks, timbers, etc.). (9)	Gas (burning or asphyxiation). (10)	Scalding (steam or water). (11)	Electricity. (12)	Hand tools, axes, bars, etc. (13)	Nails, splinters, etc. (14)	Furnace slips. (15)	Burns from matte, slag, or molten metal (pouring or spilling). (16)	Hot-metal explosions. (17)	Other causes. (18)

Result of injury.

Fatal.	Seriously injured (time lost, more than 14 days). Permanent disability. Total.[1]	Seriously injured — Permanent disability. Partial.[2]	Seriously injured — Temporary disability.	Slightly injured (time lost 1 to 14 days.)	Time lost (days) due to injury.	Part of body injured.	Remarks.

LABOR DATA for year ended Dec. [illegible]

Average number of men employed:
Mills........
Smelters...
Number of hours' labor performed [illegible] which wages were paid [illegible]:
Mills.....
Smelters...
Number of days mill was operated:
Number of days smelter was operated.

15020°—16. (To face page 88.)

FORM FOR RECORDING ACCIDENTS AT MINES AND METALLURGICA

…f accidents at the Czar mine of the Arizmo Mining Co.

Surface shops and plants (except mills and smelters).

(h) *Mechanical.*	Railway cars and locomotives.	Run or fall of ore in or from ore bins.	Falls of persons.	Nails and splinters.	Hand tools, axes, bars, etc.	Electricity: (a) *Direct contact with trolley wire.*	(b) *Tool or bar striking trolley wire.*	(c) *Contact with motor.*	(d) *Others.*	Machinery.	Other causes: (a) *Falling objects.*	(b) *Flying objects.*	(c) *Burns.*	(d) *Miscellaneous.*
	23	24	25	26	27	28				29	30			
....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

Open-pit mines.

Falls or slides of rock or ore.	Explosives: (a) *Transportation.*	(b) *Charging.*	(c) *Suffocation.*	(d) *Drilling into old holes.*	(e) *Striking in loose rock or ore.*	(f) *Thawing.*	(g) *Caps, detonators, etc.*	(h) *Unguarded shots.*	(i) *Returned too soon.*	(j) *Premature shot.*	(k) *Miscellaneous.*	Haulage: (a) *Hand and animal.*	(b) *Mechanical.*	(c) *Railway cars and locomotives.*	Steam shovels.	Falls of persons.	Falls of derricks, booms, etc.	Run or fall of ore in or from ore bins.	Machinery (other than locomotives or steam shovels).	Electricity: (a) *Direct contact with trolley wire.*	(b) *Tool or bar striking trolley wire.*	(c) *Contact with motor.*	(d) *Others.*	Hand tools.	Other causes: (a) *Falling objects other than 51.*	(b) *Flying objects.*	(c) *Burns.*	(d) *Miscellaneous.*
31	32											33			34	35	36	37	38	39				40	41			
....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

Result of injury.

Fatal.	Seriously injured (time lost more than 14 days). Permanent disability. Total.[1]	Partial.[2]	Temporary disability.	Slight injury (1 to 14 days disability).	Time lost (days) due to injury.	Part of body injured.	Remarks.	Widow.	Orphans under 16 years.
....	....	1	....	....	90	Right foot cut off......	Walking on haulage way..		
....	....	....	1	....	15	Left hand bruised.....	Oiling machinery......		
1	....	....	....	....	...	Head crushed.........	Removed prop too soon...	1	[illegible]

Mine labor data for year ended Dec. 31, [illegible].

Average number of men employed.
  Underground ....
  Surface (yards and shops).......
  Open pits....
Number of hours' labor performed by all men during year for which wages were paid as shown on pay roll:
  Underground
  Surface (yards and shops)
  Open pits....
Number of days mine was operated:
Principal mining method used.. ..
....

…of injury.								
…ured …ore …s).	Temporary disability.	Slightly injured (time lost 1 to 14 days.)	Time lost (days) due to injury.	Part of body injured.	Remarks.	Widow.	Orphans under 16 years.
....	....	....	....	....	....	....	....
....	....	....	....	....	....	....	....

Labor data for year ended Dec. 31, 1916.

Average number of men employed:
  Mills...
  Smelters...
Number of hours' labor performed by all men during year for which wages were paid as shown on pay roll:
  Mills...
  Smelters...
Number of days mill was operated...........................
Number of days smelter was operated ....

[1] *PERMANENT TOTAL DISABILITY.*—Loss of both legs or arms, one leg and one arm, total loss of eyesight, paralysis, or other condition permanently incapacitating workman from doing any work of a gainful occupation.

[2] *PERMANENT PARTIAL DISABILITY.*—Loss of one foot, leg, hand, eye, one or more fingers, one or more toes, any dislocation where ligaments are severed, or any other injury known in surgery to be permanent partial disability.

[3] *ORE-DRESSING PLANTS* to include stamp mills, sampling works, stone plants, lixiviation, leaching, cyanide, and flotation mills.

[4] *SMELTERS* to include blast, reverberatory, and roasting furnaces; converters, casting department, and refineries.

…G ACCIDENTS AT MINES AND METALLURGICAL PLANTS.

the year as shown on the pay roll. The total hours for all laborers divided by 3,000 will give the actual number of 3,000-hour workers exposed to the hazard of the industry during the year. It is for this reason that the form proposed calls for total hours worked by all men during the year.

The bureau has had a number of copies of this form printed (size 16 by 24 inches) and will gladly furnish sample copies to all those who are sufficiently interested to consider adopting it for their office records.

LAWS RELATING TO REPORTING OF ACCIDENTS.

Some features of the laws relating to the reporting of accidents are given in the following pages, by States.

ALASKA.

An act of the Legislature of Alaska, approved April 30, 1913, authorized the appointment of a Territorial mine inspector, subject to instructions of the Federal mine inspector, and provided that all serious or fatal accidents at any mine employing six or more persons should be reported immediately by the person in charge of the mine to the mine inspector of the district in which the mine was located. Each mine inspector was required to render to the governor a monthly report of all accidents in his district which resulted in serious injury or death.

As amended April 25, 1915, the law now provides that the Territorial inspector shall have jurisdiction over all branches of mining, shaft-sinking, tunneling, quarrying, and dredging, and the machinery incident to the reduction of ores or the treatment of the material, provided that such jurisdiction shall apply only to the safety of the workers in such mining, etc., and provided also that the Territorial inspector shall have no jurisdiction over coal mines worked under lease from the United States Government. The inspector is required to distribute statistical blanks to mine operators, requiring statistics of accidents, labor, and production to be filled in and returned to the inspector on or before December 31 of each year, under the same conditions as now required by the United States Bureau of Mines and the United States Geological Survey.

ARIZONA.

The law [a] of Arizona provides that all accidents causing death or serious injury at any mine shall be reported immediately to the State mine inspector. The inspector renders an annual report to the governor for the year ending November 30 (sec. 16).

By the act of June 8, 1912, as amended May 13, 1913, compulsory compensation is provided for accidental death or injuries causing

[a] Acts of 1912, ch. 33, sec. 13.

disability for at least two weeks in all especially dangerous employments, including mining, quarrying, and tunneling. The law is elective as to industries not listed as especially dangerous.

CALIFORNIA.

The Legislature of California passed an act,[a] approved April 8, 1911, providing compensation for accidental injuries and establishing an industrial-accident board to aid in the administration of the act. The act is elective for all employments except for State and local governments, for which it is compulsory. The employee also may elect not to be subject to the act by notifying his employer in writing.

On August 10, 1913, the industrial accident board was superseded by the industrial accident commission.[b]

Sections 36 to 50 (act of May 26, 1913) create an insurance fund to be administered by the industrial accident commission for the purpose of insuring the employer, at his option, against liability for compensation. The law became effective January 1, 1914.

COLORADO.

Section 4303 of the revised statutes of Colorado for 1908 provides that all accidents causing death or serious injury involving the loss of two consecutive days' work at any metalliferous mine, mill, or metallurgical plant shall be reported immediately to the commissioner of mines. The commissioner is required by section 4268 to render biennial reports to the governor. The published reports are for the calendar year.

A workmen's compensation law was enacted April 10, 1915, effective August 1, 1915, applying to all employers of four or more persons, not including private domestic servants and farm and ranch laborers, engaged in a common employment. Employers are conclusively presumed to have accepted the provisions of the act unless prior to August 1, 1915, they have filed with the industrial commission a notice of their election not to be subject thereto. The law requires employers to keep a "record of all injuries, fatal or otherwise," and to report each accident within 10 days to the commission under penalty for failure so to do. In January and July of each year all employers are required to report to the commission the number of their employees during the preceding six months and to state the number of employees in each kind of employment; also to report the aggregate wages paid. Compensation is provided for employees whose injuries result in disability for more than three weeks, or for their dependents if the injuries result fatally. The industrial commission is required to report annually to the governor on or before

[a] Laws of 1911, p. 796. [b] Statutes and amendments to the code, 1913, ch. 561, secs. 1 and 2.

December 15 for the preceding fiscal year and to include in its report a statement of the number of awards made by it and a general statement of the causes of accidents leading to the injuries for which the awards were made.

IDAHO.

Section 207 of the revised code of Idaho for 1909 provides that all fatal or serious accidents at any mine shall be reported immediately to the inspector of mines or his deputy. The inspector is required by section 209 to render an annual report to the governor. The published reports are for the calendar year.

No compensation law has been enacted.

ILLINOIS.

The law [a] of Illinois requires every employer of labor to report, within 30 days, to the State bureau of labor statistics every accident causing death or serious injury involving a loss of 30 or more days' time.

The legislature passed an act [b] June 28, 1913, relating to compensation of injured employees, and established an industrial board for its administration. The act covers every employer of labor, including operators of underground and surface mines and also quarries, and makes it the duty of all employers to report to the industrial board all accidents which entailed a loss to the injured person of one week's time, or which caused death, for which compensation has been paid under the act. The application of the act is elective on the part of the employer. Section 2 of the act provides that election is presumed unless a written notice to the contrary is filed with the industrial board and notice of such declination is given to the employees.

MARYLAND.

On April 16, 1914, the Legislature of Maryland enacted a workmen's compensation law, to be administered by the State industrial accident commission. The act applies to an enumerated list of industries which are considered extra-hazardous, including "mining, reduction of ores and smelting; preparation of metals or minerals; tunneling and shaft-sinking; quarries; clay or gravel pits; iron, steel, or metal foundries; rolling mills; and the manufacture of explosives and dangerous chemicals." No compensation is provided for the first two weeks of disability, except medical and hospital services and supplies. The act became effective to cover injuries sustained on or after November 1, 1914. Employers are required to report all accidents to the commission, and the commission renders annual reports to the governor on or before January 1 showing, among other things, the number and causes of all accidents.

---

[a] Acts of 1907, sec. 1, p. 308. [b] Laws of 1913, p. 337.

MICHIGAN.

Section 8 of law No. 163, approved April 25, 1911, requires the county mine inspector to inspect every working mine in his county at least once every 60 days, and section 10 makes it the duty of all operators to render any needed assistance to the inspector in his work. Section 13 provides that the inspector shall report annually to the county clerk all mine accidents causing death or personal injury. The published reports are for the fiscal year ending September 30.

Compensation is provided for accidental deaths or injuries causing at least two weeks' incapacity to earn full wages. The compensation law is elective and is applicable to all industries having one or more persons under contract or hire. Every employer subject to the law is required to keep a record of all injuries, fatal or otherwise, received by his employees and to make a written report thereof within 10 days to the industrial-accident board.

MINNESOTA.

Paragraph 3924, general statutes of Minnesota, 1913, provides for the appointment of a county mine inspector for every county in which at least five mines are in operation. The inspector must visit every mine in his county at least once every 60 days (par. 3926). All operators are required (par. 3931) to give immediate notice to the inspector of all accidents causing loss of life or serious personal injury. The inspector's annual reports are for the fiscal year ending June 30, and are included in the biennial report of the State commissioner of labor (par. 3934).

An elective compensation law provides compensation for injuries causing death or causing disability for more than two weeks. The law (act of April 24, 1913) applies to all industries except farm and domestic service and interstate or foreign commerce.

MISSOURI.

Section 8462, revised statutes of Missouri, 1909, as amended March 25, 1913, provides that any person having charge of a mine shall report to the State mine inspector all accidents causing loss of life or serious personal injury. The inspector renders an annual report to the governor for the calendar year.

No compensation law has been enacted.

MONTANA.

Sections 1717 and 1720 of the revised code of Montana for 1907 provide that operators of all metalliferous mines in which five or more men are employed shall immediately report to the mine inspector all accidents causing death or serious injury. The inspector's reports are for the fiscal year ending November 30. By act of March 4, 1913,

the inspector's office is made a part of the department of labor and industry, and the inspector's reports are combined with those of the other branches of the department to form one volume to be published biennially.

A law providing compensation for injuries was enacted in 1909, but was declared unconstitutional, leaving no compensation law in force.

NEVADA.

The Nevada laws of 1912 provide that all mine operators employing wage earners shall render a report to the inspector of mines of all accidents causing death or serious injury. The report of the inspector is for the fiscal year ending November 30.

An elective compensation law (act of Mar. 15, 1913), applicable to all industries employing two or more persons, provides for compensation for accidental injuries resulting in death or incapacity to earn full wages for at least two weeks.

NEW JERSEY.

An act approved by the Legislature of New Jersey March 24, 1904, as amended March 26, 1912, provides that all accidents resulting in death, or that prevent the injured person from resuming work within 2 weeks, shall be reported to the commissioner of labor within 24 hours after the expiration of 4 weeks or after the death of the person injured. An act approved April 17, 1914, and effective that date, amended the act of March 24, 1904, by creating the office of inspector of mines and quarries and authorized the appointment of an inspector.

The State has an elective compensation act (laws of 1911, chap. 95), and the statutes require every employer to report all accidents to the "Employers' Liability Commission," and to state whether the employer is subject to the compensation law.

NEW YORK.

Chapter 15 of the New York laws of 1910 provides that all accidents causing loss of life or injury incapacitating any person for work in the operation of a mine or quarry, or in the construction or repair of a tunnel, shall be reported within 48 hours to the commissioner of labor. The published reports of the commissioner of labor are for the fiscal year ending September 30.

Under the workmen's compensation law, approved March 16, 1914, effective July 1, 1914, compensation is provided for accidents causing injury or death to persons engaged in certain enumerated industries classed as hazardous, among which are included mining; reduction of ores and smelting; preparation of metals or minerals; quarries; sand, shale, clay, or gravel pits; lime kilns; iron, steel, or metal foundries; rolling mills. The law is compulsory as to the industries enumerated. No compensation is allowed for the first

14 days of disability except such medical or surgical treatment and hospital service as may be needed and requested by the injured employee. All accidents, fatal or otherwise, must be reported by the injured person or by another person in his behalf to the employer, and by the employer to the compensation commission. Nonfatal accidents must be reported to the commission by the employer within 10 days after injury and fatal accidents within 30 days after the death of the injured employee. The law is administered by the State workmen's compensation commission, which is required to report annually to the legislature on or before February 1, showing the awards made by it for injuries, and the number and causes of such injuries.

OREGON.

An act approved by the Legislature of Oregon, February 18, 1911, provides that any employer of labor who employs more than three persons at a time shall report to the commissioner of labor statistics and inspector of factories and workshops all accidental deaths or injuries, causing the injured person to cease work.

An act[a] approved February 25, 1913, created a State industrial accident commission and provided for an industrial accident fund. Election on the part of operators to be subject to the law is presumed in the case of certain hazardous industries, including mining and quarrying, unless notice of the employer's declination is filed with the commission; and employers in all other industries may accept the law by affirmative election. This act was approved by the electors at a referendum held November 4, 1913.

PENNSYLVANIA.

On June 2, 1915, the legislature of Pennsylvania passed a workmen's compensation law applicable to all accidents occurring on or after January 1, 1916. The employer's election to become subject to the law is conclusively presumed unless he files notice to the contrary with the bureau of workmen's compensation of the department of labor and industry. No compensation is provided for the first 14 days of disability except medical and hospital services and supplies. Compensation for death is provided if death occurs within 300 weeks after the injury. The bureau prepares and publishes all necessary blank forms and distributes same to employers, insurers, and employees applying therefor. Funds paid by employers who elect to become subject to the law constitute the workmen's insurance fund, which is administered by the workmen's insurance board. The State treasurer is custodian of the fund. The workmen's insurance board files with the bureau of workmen's compensation a notice of the names and business addresses of all employers who are subscribers to the fund. Within seven days after an accident to an employee, employers are required to send notice of such accident to the workmen's insur-

[a] Laws of 1913, ch. 112.

ance board, but this requirement is satisfied if within seven days the employer files a notice of the accident with the department of labor and industry as required by the act of July 19, 1913. The board shall, if necessary, investigate all accidents reported, and is authorized to appoint a manager, inspectors, and other assistants to administer the fund and to perform the duties imposed on the board.

The board is authorized to divide the State into "compensation districts" and to appoint for each district a referee to whom employees' claims for compensation are referred by the bureau when the employer and employee can not themselves agree as to the compensation to be paid.

When the bureau receives notice from the board that any employer has become a subscriber to the fund, the bureau shall promptly transmit to the board a copy of any accident notice received by the bureau from any subscribing employer. The board is authorized to supervise and direct the work of the bureau, and to hear all appeals from the decisions of referees.

SOUTH DAKOTA.

By an act approved March 1, 1890, the governor of South Dakota was authorized to appoint an inspector of mines, whose duty it was to visit personally each year each mining county and to examine as many mines therein as possible, and make recommendations as to the safety of the employees. Mine operators were required to report to the inspector all accidents causing serious injury or death. The above act, as amended March 4, 1915, provides that the inspector shall render annual reports to the governor on January 1 and enumerate in said reports all serious or fatal accidents to employees at the mines and the nature and cause of such accidents. The inspection law applies to all mines except those worked solely by the owners or lessees.

No compensation law has been enacted.

WASHINGTON.

By an act approved March 14, 1911, amended March 22, 1915, the Legislature of Washington established an industrial insurance department to administer a compulsory compensation law applicable to an enumerated list of extra-hazardous industries, among which are included mining, quarrying, dredges, tunnels, blast furnaces, foundries, rolling mills, and powder works. Section 14 requires all employers who are subject to the provisions of the law to render an immediate report of any accident to the industrial insurance department.

WISCONSIN.

The legislature passed an elective workmen's compensation law, approved May 3, 1911, applying to all employers of four or more persons, election to be made by filing with the industrial accident board a notice that the employer elects to become subject to the pro-

visions of the law, the election to be binding for one year and thereafter presumed to continue without further notice in the absence of notice of withdrawal. Compensation is provided for injuries resulting in disability for more than one week.

An act approved June 27, 1911, requires that every employer of four or more persons shall keep a record of all accidents causing death or disability to any employee, and that a similar record shall also be kept by all casualty insurance companies and all other societies or persons indemnifying employers against liability; and that within the first five days of each month all such accidents shall be reported to the industrial accident board.

An act of June 30, 1911, created the "industrial commission of Wisconsin" and provided that the commission should supersede and assume the duties of the industrial accident board.

By an act approved June 26, 1913, the law was amended to provide that on and after September 30, 1913, all employers of four or more persons shall be presumed to have elected to accept the provisions of the act unless notice to the contrary is filed with the industrial commission.

PUBLICATIONS ON ACCIDENT STATISTICS.

Limited editions of the following Bureau of Mines publications are temporarily available for free distribution. Requests for all publications can not be granted, and applicants should select only those publications that are of especial interest to them. All requests for publications should be addressed to the Director, Bureau of Mines, Washington, D. C.

BULLETIN 69. Coal-mine accidents in the United States and foreign countries, compiled by F. W. Horton. 1913. 102 pp., 3 pls., 40 figs.

BULLETIN 115. Coal-mine fatalities in the United States, 1870 to 1914, compiled by A. H. Fay. 1916. — pp.

TECHNICAL PAPER 40. Metal-mine accidents in the United States during the calendar year 1911, compiled by A. H. Fay. 1913. 54 pp.

TECHNICAL PAPER 46. Quarry accidents in the United States during the calendar year 1911, compiled by A. H. Fay. 1913. 32 pp.

TECHNICAL PAPER 48. Coal-mine accidents in the United States, 1896–1912, with monthly statistics for 1912, compiled by F. W. Horton. 1913. 74 pp., 10 figs.

TECHNICAL PAPER 61. Metal-mine accidents in the United States during the calendar year 1912, compiled by A. H. Fay. 1913. 76 pp., 1 fig.

TECHNICAL PAPER 92. Quarry accidents in the United States during the calendar year 1913, compiled by A. H. Fay. 1914. 76 pp.

TECHNICAL PAPER 94. Metal-mine accidents in the United States during the calendar year 1913, compiled by A. H. Fay. 1914. 73 pp.

TECHNICAL PAPER 118. Coke-oven accidents in the United States during the calendar years 1913 and 1914, compiled by A. H. Fay. 1915. 16 pp.

TECHNICAL PAPER 124. Accidents at metallurgical works in the United States during the calendar years 1913 and 1914, compiled by A. H. Fay. 1915. 28 pp.

TECHNICAL PAPER 128. Quarry accidents in the United States during the calendar year 1914, compiled by A. H. Fay. 1915. 45 pp.

Coal-mine fatalities in the United States, 1914, with detailed figures for December, compiled by A. H. Fay. 1915. 31 pp.

○